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Why ask for the moon
when we have the stars?

AS

THE

PHOTOGRAPHIC NEWS:

A WEEKLY RECORD

OF THE

PROGRESS OF PHOTOGRAPHY.

VOLUME IV.

"*Nulla recordanti lux est ingrata.*"—MARTIAL.

LONDON:
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PREFACE.

One of the oldest and best of English novelists has stated an author to be in the position of "one who keeps a public ordinary, at which all persons are welcome for their money." If this be true of an author, it is pre-eminently so of the editor of a periodical. He is bound to provide a constant succession of dishes, both substantial and piquant, wholesome and pleasant, suited at once to the requirements and tastes of his various guests.

To continue the simile, we have endeavoured not only to provide an ample supply of everything in season, conducive either to the comfort, convenience, or need of our especial class of guests, but we have endeavoured to promote that conversation thereon, and pleasant interchange of thought between our friends, without which the richest feast often becomes a dreary, flat, and stale affair. As becomes a host, we have rather busied ourselves in providing the fare, than in monopolizing the conversation. Where our suggestions, advice, experience, or information have been important or desirable, we have unhesitatingly tendered them; but we have been content on other occasions to avoid obtruding our personality; rather devoting our attention to carefully selecting, arranging, and directing everything connected with the completeness and success of our weekly ordinary.

To drop the metaphor, and at the conclusion of the Fourth Volume of the Photographic News, avail ourselves of the opportunity of addressing, as it were, personally, the many thousands of our readers in all parts of the world, we may remark that we believe that the pledges with which we entered on our editorial duties, little more than four months ago, have been fulfilled; and we have the assurance, not only from the multiplicity of kind and congratulatory letters we have received from correspondents, to whom personally we are entirely unknown—to one and all of whom we here tender our hearty thanks,—but also from the increased circulation and influence of the Photographic News, that our exertions have been appreciated.

But eight years ago it was thought a bold thing to establish one monthly journal, to be devoted exclusively to an art so young as Photography; and little more than two years ago, when this Journal was first projected, it was regarded as the height of temerity to hope to fill the pages of a weekly journal, with interesting matter of so purely sectional a character, and as little short of madness to hope to secure sufficient readers to support the necessarily large expenses of such an undertaking. Nevertheless the Photographic News became at once, and decidedly, a success, assuming a position, in point of circulation, far in advance of its compeers. Since that time some of them have been enlarged and conducted with increased energy and ability, our success having given a general stimulus to enterprize in Photographic journalism: we may unhesitatingly state, however, that we still retain the same pre-eminence.

It is a hopeful sign of the position of Photography generally, that it now maintains seven serial publications called by its name, devoted to its interests, and filled with its literature. One weekly, two fortnightly, one monthly, one quarterly, and two yearly issues, all conducted, with more or less of ability, all finding sufficient purchasers and readers to render their issue commercially remunerative. May the shadow of any one of them never be less!

In the volume to be commenced, we hope to present many new features of interest to our readers, arrangements for their appearance being now pending. Our exertion shall in no wise be relaxed, whilst our facilities will in various ways be materially increased. It shall still be our aim to give the best original articles, by the most able writers; the best practical information, from the most capable manipulators; the earliest information of everything new or interesting connected with our art, whether at home or abroad; the fullest field for interchange of thought and experience amongst our readers; and the fullest information on all subjects coming within our scope, to all enquiries.

Not the specific organ of any society, we are not pledged to the official and full insertion of their documents, irrespective of their interest and importance to our readers. Fully alive to the continually increasing interest of the meetings of societies, we shall at all times continue to give such full or condensed accounts, of all matters of interest or importance in their proceedings, as we may derive from our own attendance or that of our reporters, the courteous contributions of their secretaries, or by condensing from their respective official journals, and thus endeavour to maintain the position of a recognized organ of Photography and Photographers at large.

In short, it will be our aim that the PHOTOGRAPHIC NEWS shall continue to be at once the registrar and exponent of all that is interesting in the scientific, practical, and artistic phases of Photography and the cognate arts.

December, 1860.

THE PHOTOGRAPHIC NEWS.

Vol. IV., No. 87.—*May* 4, 1860.

DRY COLLODION.

BY M. PESCHARD.

Every photographer earnestly covets a dry collodion process which can be depended upon, so that he may free himself from a cumbersome amount of luggage, which is essential when setting out on an excursion to take views with wet collodion.

The collodio-albumen process requires an amount of preparation and manipulation calculated to deter most amateurs, and very many professional photographers; and success seldom results, except in well-experienced hands.

. If a sure and certain dry process could be found, it would constitute the greatest boon science is capable of presenting to photography; it would free the operator from so much care, labour, and anxiety. The following suggestions are based upon experience, in which the results were as described, and perfectly satisfactory.

The Collodion:—

Ether	2 ounces.
Alcohol	$1\frac{1}{2}$,,
Pyroxyline	6 grains.
Iodide of cadmium	5 ,,
Bromide of cadmium	1 grain.
Pure rosin.	4 grains.

The rosin is not added until the other ingredients are all dissolved. When the mixture is complete, add thirty drops of the following:—

Alcohol	5 drachms.
Liquid balsam of Peru	$2\frac{1}{2}$,,

Allow the whole to stand for two days, then filter through cotton.

Sensitising.—Make a silver bath, neutral, of the strength of 8 per cent., or 35 grains of nitrate to the ounce of distilled water. When the plate is removed from this bath, carefully wash it with a gentle stream of water, and place it to drain; then dry on blotting paper, and preserve for use in a tight box lined with black paper. The plates will retain their sensitiveness for a week or more.

The washings must not be made with water containing earthy matters. Boiled rain-water answers very well.

Developing:—

Rain-water	20 ounces.
Pyrogallic acid	3 grains.
Citric acid	3 ,,
Alcohol	1 drachm.

Before developing, moisten the plate all over with water; then, without loss of time, pour the above developing solution over it three several times as evenly as possible; then adding to the same solution a few drops of nitrate of silver, of the strength of 4 per cent., or $17\frac{1}{2}$ grains to the ounce, pour it over the plate again several times, until the development is completed, which it should be with perfect regularity and uniformity. When the temperature is below 60°, the plate, previous to development, should be gently warmed before the fire, and the washings made with tepid water.

Development may be delayed three or four days after exposure in the camera.

Fixing.—Fix with hyposulphite of soda of the strength of 30 per cent., or 6 ounces to the pint of water.

With a stereoscopic lens, in full summer sunshine, the exposure required was about forty seconds.

ON THE CAUSES OF FADING IN POSITIVE PROOFS.*

Having passed in review the various decompositions which take place in the fixing baths of hyposulphite of soda, it now remains to examine carefully the causes of fading in positive proofs.

It has been generally remarked, that if a proof, when taken from the printing frame, is washed in only one or two waters, after the lapse of a few days, the print will turn quite yellow. In other words, a proof that is not completely freed from hypo. by repeated washings, fades in the course of time, sooner or later.

It is notorious that the fading takes place much more rapidly in proportion to the quantity of sulphur in the proof.

Such being the fact, let us inquire what is the nature of the chemical action by which the sulphurising is effected? It has been stated, in a previous portion of this article, "*that every proof which remains too long a time in hyposulphite of soda, passes into the condition of sulphide of silver and sulphur.*"

We may now conclude, that, whenever a proof retains sulphur, it will fade. Still, it would be imprudent to draw this conclusion from a single experiment: let us examine the other circumstances in which the proof is subject to fade.

When a proof exhibits yellow hues in the blacks, by the action of decomposed hyposulphite, it will fade in a few months.

A proof immersed first in acid, then in hypo., appears of a fine colour, but it will retain sulphur. This proof will also fade.

We can sum up the causes of fading in positive proofs in two general principles:—

1. When the composition of a hyposulphite of soda bath is such that it produces a sulphide of silver which forms the proof, the picture will fade.

2. If a hyposulphite bath, by the presence of an acid, or an excess of a salt of silver, deposits sulphur upon the image, it will fade also.

These two cases being defined, having examined the case of the decomposition of the fixing baths, we will state under what circumstances the proof will fade, through the injudicious employment of these baths:—

1. If the proof is not washed in several waters on being taken out of the hyposulphite of soda, so as to remove every trace of hypo. from the paper.

2. When the proof remains too long in a new bath of hypo., or even if it be toned in an old bath.

We might adduce various other causes of fading in positive proofs; but those named being of the greatest importance, they will be carefully detailed.

If, on taking the proof out of the hypo. bath, it be left in water for several days, it takes a yellow hue exactly like that of a faded proof. A comparative experiment was made upon two proofs—the one formed of pure silver, the other of sulphide of silver. The latter faded in less than four days, while the former faded in twenty-two days.

Thus it appears that moisture is eminently injurious to paper proofs, as many skilful operators have proved.

It is also evident that the sulphuretted hydrogen present in the atmosphere exercises an injurious influence on the proofs.

Several kinds of varnish have been proposed for covering the proof with a substance impervious to the air. This method is not only advisable, but necessary to the preservation of the layer of metallic silver. It is beyond doubt that silver has a very great affinity for sulphur, and absorbs it from the atmosphere whenever it is present in it. As to iodine, this substance exists in the air in so small a quantity, that its influence need not be taken into consideration; it is the same with some other principles existing in the atmosphere.

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* Continued from vol. iii. p. 404.

As to the nature of the change the proofs undergo, no satisfactory explanation has yet been given. With some operators it is the opinion that the image is changed into sulphate, but we must first examine in what manner the sulphur is absorbed, for we have in our possession proofs in pure silver which have also faded.

By others—and their opinion appears to be the most probable—it is admitted that the proof is formed of sulphide of silver which has undergone an isomeric change, of which chemistry presents so many examples. Such is the opinion of M. Davanne, in which we fully partake.

But then the question arises, How do the *whites* of the proof become yellow? Let us state two cases, to which we earnestly call the attention of operators:—

1. A proof is formed of pure metallic silver, and contains no trace of salts of silver in the whites. Supposing the proof fades, it would be useful to know *if the whites become yellow.*

2. It is very important to ascertain the *nature* of the change which takes place *in the whites* of *sulphurised* proofs. We have carefully explained how a proof may retain a certain quantity of the salts of silver in the whites. Now, if the air changes this silver into sulphide, the phenomenon of these parts, becoming yellow by time, explains itself.

It is our belief that, if a solution can be given to these two problems of the changes in the proofs, a great step towards perfect fixing will have been attained.

(*To be continued.*)

ON THE CORRELATION AND HOMOGENESIS OF PHYSICAL FORCES.

BY THE ABBÉ MOIGNO.

All the forces of nature—motion, heat, light, electricity, magnetism, chemical affinity—have intimate relations, or correlations, with each other. These forces engender each other; so that, one being given, we can, by putting it in action, produce all the others. This generation or homogenesis of the various forces by each other, takes place in definite proportions, or according to the law of fixed equivalents; so that the quantity of any one of these forces expended in the act of generating another force is always represented by a corresponding quantity of the force engendered. Thus, for example, if, to create a mechanical force, we expend, without loss, the quantity of heat necessary to raise a kilogramme of water one degree of heat, the mechanical force produced will be capable of raising, in a second of time, 427 kilogrammes to the height of a metre; and, reciprocally, if, to produce one degree of heat, we expend the force capable of raising a metre in height, in one second, a weight of 427 kilogrammes, the quantity of heat engendered will be that necessary to communicate, and will suffice to communicate to a litre of water, one degree of temperature. M. de Beaumont's machine admirably demonstrates this fundamental principle, which will receive its full development when science shall have become able to define and accurately determine the mechanical, thermal, photogenic, electric, magnetic, and synergic equivalents, as clearly and as accurately as it has arrived at determining the chemical equivalents of various simple and compound substances.

But this is not all. In making another step in advance, we have established, as a certain proposition, that the generation or homogenesis of the various forces of nature is accomplished by a real transformation of one into another; so that, for example, heat, under given conditions, is transformed into a motive power, into light, electricity, magnetism, and chemical affinity; or rather, becomes motive power, light, electricity, magnetism, and chemical affinity. The beautiful experiment of Faraday, completed and fully developed by Foucault, of a cube submitted to rapid motion becoming hot when this motion is suddenly stopped, is the sufficient and certain demonstration of the transformation of the quantity of motion into the quantity of heat—a transformation regulated by the principle of equivalents. At length we arrive at the theory or metaphysical reason of these intimate relations of the homogenesis, of these mutual generations or transmissions, always obeying the laws of equivalents. Our profound conviction is, that Mr. Grove and M. Seguin are perfectly correct when they assert that in nature there are only two things, matter and motion: matter under two forms, and submitted to the law of universal attraction; motion once impressed on matter, which cannot augment either in its quantity nor in the sum of its active forces, which may be successively transformed and modified.

When a ray of light falls upon a daguerreotype plate, forming part of a galvanic circuit which includes a galvanometer and Breguet's metallic thermometer, there is instantaneously and simultaneously produced chemical affinity on the surface of the plate, an electric current in the galvanometer, an elevation of temperature in the thermometer, motion in the two needles of the galvanometer and thermometer, &c. As a concrete and striking example of homogenesis, we may instance what we will term the human machine, the masterpiece of creative power. It is sustained solely, first by alimentary provision, composed of carbon, hydrogen, nitrogen, and assimilative mineral principles, then by atmospheric air introduced by respiration. The vital phenomenon, *par excellence,* is the combustion of carbon and hydrogen by the oxygen of the atmosphere—a combustion which, it appears to us, is summed up in a first disengagement, in a first motion, in a first circulation of μ. Now, observe to what this first motion gives birth: a very intense heat, which maintains our whole body, even in winter, at a temperature of 98° F., an electric or nervous current, of which M. Helmholtz has established the existence and measured the velocity; the circulation of the blood in the entire system of arteries and veins; a mechanical force sufficient to transport the entire body which, upon an average, weighs 160lbs., with a velocity of several yards per second; the muscular force exercised by the various organs which makes of an active man one of the strongest animals in creation; chemical affinity under a thousand different forms, with the very complex series of combinations and decompositions, assimilations and secretions, &c.; evidently, this is not only the correlation of physical forces, it is also their homogenesis, their mutual transformation, their identity in cause, and also in nature, &c.

The human machine brings us to the gas machine, described on p. 339, vol. iii., which is as perfect an imitation of it as there can be. This, like the other, is fed by an internal contribution of carbon and hydrogen, and by the introduction of atmospheric air, or of oxygen, from without. In both, the immediate phenomenon, before all the others, is a combustion of the carbon and hydrogen with considerable elevation of temperature, with the formation of watery vapour or steam, and of carbonic acid, with dilation of the gases arising from combustion, or which have escaped combustion, with internal pressure, and generation of mechanical force and motion. The principal obstacle the machine we described had to contend with was, that the cylinder became too hot, and impeded the piston: this excess of heat is a feature in common with the human machine. For, if the cutaneous transpiration had not followed the expiration of the gases burned, the temperature of the body would have gone on increasing unceasingly, and its excess would ultimately have produced complete asphyxia with cessation of the motion of the heart; this is what happened, in fact, in the experiments where a human body was coated with tar. In the gas engine it is necessary to apply an artificial cutaneous transpiration by making a slight jet of water play upon the cylinder, which cools it, and the motion of the piston continues uninterrupted.

ON THE INFLUENCE OF A DRY ATMOSPHERE ON POSITIVE PAPER.

The inconvenience arising from the rapid discoloration of sensitised positive paper, especially in summer time, led to the introduction of the "preserving cases." The efficacy of these cases is due to the presence of chloride of calcium, which rapidly absorbs all the moisture from the air contained in the box. Now, although moisture, especially when accompanied by heat, is the cause of the discoloration in the silvered paper, yet a certain amount of moisture is necessary in the paper, to enable the chemical change the silver undergoes, when exposed to light, to be properly effected. It was found that paper which had been kept in the preservative cases, did not print well; that the proofs were exceedingly weak. The cause of this is, that the paper becomes too dry. But this is no reason why we should throw aside the preservative cases, because they are really useful. It is only necessary to restore moisture to the sensitised paper before putting it into the printing frame. This can easily be done by placing paper between some damp sheets of blotting paper for a few minutes previous to using. The damping must be moderate, else the sensitised paper becomes uneven, and is difficult to lay flat on the glass positive.

The Photographic Tourist.

A PHOTOGRAPHIC TRIP UP THE VALE OF NEATH.*

BY J. H. JONES.

The east front gives two beautiful pictures, the south front one, the west one, and the north two; the chapter-house forms another good picture, and the ruins of the church are beautiful in the extreme. The western window must have been of enormous proportions, but not too large when compared with the size of the church itself, although there appears to have been at least twelve additional side windows. It forms a splendid picture taken from the conventual buildings, and also from a bank close by: the ruined arches covered with ivy scattered over the adjacent ground, also form very good pictures if carefully selected; and I think that the time lost in looking for the best point of view more than repays any one for the trouble; for we are sure to discover some new treasure by our examination, and the satisfaction we feel, when we find other "*bits*" to fire away plates at, is very pleasing indeed. There is also another view, which I may call a general one, to be had from the top of the church walls, but I had to scramble up to get at it, which was no slight task, when burdened with the camera; indeed, a person who was with me said, that it was what he should call "the pursuit of photography under difficulties;" but "nothing venture nothing have" is an old adage, and a very true one. Upon finishing this picture, I found it was time to pack up and be off, and, while doing so, I thought how profitably another day could be spent among the ruins of the old abbey, which presents so many interesting architectural studies. Not wishing to return by the canal side, I crossed the fields, and, after gaining the turnpike-road, began to look for what is generally known as the Abbot's Stone. This is a rude stone, shaped like the lid of a coffin, with a cross chiselled on it; at the foot of which is a prostrate effigy of an abbot, in freestone, but so much mutilated by time and rough usage, that little can now be traced of it, except the folds of the dress. It is about a quarter of a mile from Neath, on the turnpike-road to Swansea, in a field on the right-hand side, nearly opposite the Neath Abbey Coal Company's coal pit.

Leaving Neath by the evening mail train, I ascended the Vale of Neath, which extends in a south-westerly direction, from the head of the Neath River, formed by the confluence of many mountain streams, for a distance of about thirteen miles, and, although it varies in breadth very considerably, it yet preserves a much straighter course than most of the valleys of South Wales. At first, the surface of the vale is flat and marshy, but bounded by mountains, which soon assume a bold and striking character. Stopping at Aberdylais for the night, I arose early the next morning, and, after breakfast, started for the cascade, which, although on a small scale, is still very beautiful; but it is difficult to get at: the best point of view is at the bottom of the river (the Dulais), but it well repays the trouble. After taking this and two other pictures of "*bits*" of rock near the fall, I packed up and prepared for the coming up-train, and proceeded to the next object of interest, which is at Resolven. The journey from Aberdylais to Resolven is quite a treat; the railway is carried through some very romantic scenery; there is on the left, or west side, a succession of woods for about five miles, the property of Mr. J. Dillwyn Llewellyn of Penllergare (the discoverer of the oxymel process), who is also the owner of Yries-y-gerwn, the old Welsh mansion of the Llewellyns, which is almost hidden by trees in the vicinity of the road. Passing this as well as Mr. Vaughan's mansion, Rheola, which is happily placed in one of the most exquisite scenes in Wales, I arrived at the Resolven station, and, procuring a guide at the Vaughan Arms, proceeded to the Melin-court fall, which is about a mile distant from the station. This fall is a descent of the river Cleddaugh. Following the winding path leading to the bottom or bed of the river, I came in full view of this magnificent object. Shut in by mountains on either side, the mass of waters leaps over a shelving rock, eighty feet high, in one continuous volume, and falling on a large stone, or, more properly, a mass of rock beneath, scatters the spray to a distance of twenty or thirty yards; the force is such that it makes the ground tremble beneath it. With the exception of the Mynach falls, this is the largest in South Wales, and unrivalled in its accessories, considered as an inclosed scene. The rich clothing of the precipice, the overcast hue of the objects, the foliage intervening and intercepting the view, and preventing the whole from being exhausted, conspire, with the magnitude of the principal feature, to increase not only the interest of the spot, but also the feelings of the spectator. I planted the camera on a large stone in the centre of the dingle, and after exposing a plate, ascended another pathway nearer the fall, and was much gratified with the view which presented itself. No person standing on the high ground near the top of the fall, with his back towards it, and looking up the dingle, would suppose that the quiet, softly-gliding river before him could become, within a distance of ten or twenty yards from where he stands, the boiling, surging scene behind him. The river gently murmurs over its pebbly bed, and being joined, within fifty yards of the edge of the rock, by a mountain stream, it falls into a natural basin or hollow just above the fall, from whence it rushes out with such impetuosity as you would little suppose it capable of. A rustic bridge formed of two trunks of trees resting on their extreme ends on two heaps of loose stones, and fenced with the unbarked branches of trees, seemed to give the view an air of quiet simplicity such as I have seldom met with; no doubt but that the feeling was heightened by the contrast of the scene I had just left below. I took a view of it, with the guide resting or leaning on the handrail, with his dog at his feet; thus giving it an additional feature of real country life. On retracing my way back, I exposed a plate on a view of an old iron-works, once famous for its large blast furnace, its finery, and its foundry; the diameter of one wheel alone measured forty feet, and the action of the bellows was so powerful that, if increased to the degree of which it was capable, it would entirely shatter the whole building. The guide said "that it was here all the 'cannon balls' were made, that were used at the Battle of Waterloo," but how far this is true I cannot say. It is now a heap of ruins, and few persons looking at it, amidst the peaceful silence which reigns around, could imagine that it ever presented so contrary an aspect to that it now bears. I then made my way back to the Vaughan Arms, and, after partaking of refreshments, strolled about the village, until the train arrived which would take me still further up the valley, and it was while doing so that I saw one of the largest coal trains that I have ever seen in my life. It came tearing down the incline, which is 1 in 50, at a most tremendous rate; there could not possibly be less than seventy trucks, each carrying about ten tons. The breaksmen were clinging to the sides of the coal-boxes, and standing on the levers of the breaks, which were all on fire. It was, indeed, a strange sight to see this monstrous train rushing with such speed through the now total darkness of the night, and conjured up thoughts which, perhaps, would be out of place in these pages. At length the train came, and I was once more on my journey, and in a few minutes found myself at the Glyn Neath station. Midway between the railway station and the village of Glyn Neath is the Aberpergwn estate, the property of Mr. Williams, in the grounds of which is a very beautiful chapel, and also a waterfall; but, as it was night, I had no opportunity of visiting them. A short walk from thence brought me to the well-known public-house called the "Lamb and Flag." Here it is that most visitors to this delightful valley put up; but I would advise any person coming here to do as I did—push on for the hamlet of Pont Nedd Vechan, two long miles higher up; which, in point of situation, is infinitely preferable, as it is on the edge of the waterfall district, in Brecknockshire. This village stands. as it were, at the head of the valley, on the confines of the two counties, and at the confluence of five rivers; each of them contributing its rocks, woods, and waterfalls to the general grandeur and magnificence, which here seem to be brought together as in a focus. The Neath river, on which the village stands, is the principal; its double head is mentioned by Drayton. The source of that branch, which fertilises the spot in question, is at the distance of some miles due north; but the Neath Vechan branch rises far to the north-east, on the Mounchderry Mountain, and, after dividing the counties of Brecknockshire and Glamorganshire in a wide and circuitous sweep, joins its sister stream just at Pont Nedd Vechan. The other tributary rivers are the Melte and Hepste, rising from different, but not far distant, sources; and, after their union, pouring themselves into the Perddyn river, which likewise receives Tragarth, or the Sehryhd, and conveys its collected waters into the Neath. Augmented by such copious contributions, the Neath river rolls onward through the valley in a body, and with a force truly majestic. The number of cascades in every direction is so great, that it is difficult—and, perhaps, unnecessary—to visit them all. Neath, Melte, Tragarth, and Perddyn have each of them one—besides the wonderful cavern through which the Melte flows—and the Hepste five. In order to explore the beauties of these rivers, the Merthyr-Tydvil road is to be followed till it leads to a grand pass, forming as sublime and romantic a scene as can well be conceived in this or any other country. But I wish all visitors a much pleasanter walk to it than I had; for shortly after I passed the "Lamb and Flag" it began to rain, and, thinking it might only be a passing shower, I kept on; but long before I got to my journey's end I was wet to the skin, and covered with mud, the road being strange and the night so very dark, that nearly every step I took was into a cart-rut or puddle. Wet, weary, and dispirited, I at length arrived at the "White Horse," a little inn, which I can safely recommend to any visitor, as possessing qualities which are not often met with in country places.

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* Continued from vol. iii. p. 389.

(*To be continued.*)

Dictionary of Photography.

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Nitric Acid.—An acid composed of one atom of nitrogen and five atoms of oxygen, combined with one atom of water, constituting what is termed monohydrated nitric acid. Its formula is NO_5+HO. It is prepared by heating nitre or saltpetre (nitrate of potassa) with concentrated sulphuric acid. It may also be obtained by direct combination of oxygen and nitrogen, by the agency of the electric spark. As an acid, it is more feeble and volatile than sulphuric acid, which separates it from its compounds. Nitric acid, when pure, is colourless, transparent, and of a very sour, corrosive taste. It stains the skin and most animal bodies yellow, and destroys animal and vegetable substances; it has a strong, suffocating odour; fumes in the air, by combining with the moisture present in it (*fuming nitric acid*), and fumes still more if ammonia be present. The monohydrated acid has a strong affinity for water; when mixed with it, a great rise in temperature takes place. In this *hydrate*, the proportion of oxygen in the water to the oxygen in the acid is as 1 is to 5. In the second hydrate. the proportion is changed from 4 to 5, and the formula becomes NO_5+4HO, forming a much more stable body than the first.

Monohydrated nitric acid boils at 187° F.; the boiling point of nitric acid varying with the quantity of water present in it. When it contains 40 per cent. of water, the boiling point is 251° F. Nitric acid has not been obtained in an anhydrous state, or entirely free from water: it is said, however, to have been produced by treating nitrate of silver with dry chlorine. In its most concentrated state it contains 14 per cent. of water, possessing a density of 1·522. The acid formed by 60 per cent. of real acid and 40 per cent. of water presents all the characteristics of a definite compound.

Nitric acid is a most powerful oxidising agent, and, as such, is of daily use in the laboratory. It is readily decomposed by a great number of substances, to which it gives up a portion of its oxygen. Charcoal and sulphur decompose it at a boiling temperature; several metals decompose it at ordinary temperatures when diluted with water, which is decomposed as well as the acid, both yielding oxygen to oxidise the metal.

The nitric acid of commerce is sufficiently pure for ordinary purposes. When required for analytical purposes, it may be purified from the chlorine and sulphuric acid it usually contains by the addition of a small quantity of a concentrated solution of nitrate of silver, and then distilling it in a glass retort. A test of its purity may be found, when, diluted with 10 parts of water, it gives no precipitate with nitrate of silver, which proves the absence of chlorine and iodine; nor with nitrate of baryta, which proves the absence of sulphates: if heated upon a slip of platinum it ought, if pure, to evaporate without residuum.

When employed in the production of nitrate of silver, it is first necessary to add to the nitric acid a small quantity of a solution of nitrate of silver, to precipitate the chlorides and allow the liquid to become clear by repose; the clear liquid decanted, the silver may be added to it; without this precaution, the nitrate of silver produced will contain chloride, and make its solutions turbid. Nitric acid serves to produce all the nitrates; mixed with twice its bulk of hydrochloric acid. mutual decomposition ensues, and nitro-hydrochloric acid, called also nitro-muriatic acid, *aqua regia*, is formed.

(*To be continued.*)

The Amateur Mechanic.

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METALS.

It is not our intention to follow out into detail the various manipulations in working wood. The variety of occasions in which a knowledge of the right methods of joining, constructing, and repairing wooden articles, will prove useful, will be almost endless; but the general hints we have already given will be sufficient guidance for the inventive genius of the amateur mechanic, without minute descriptions of the various operations and contrivances to which his skill may be applied. In like manner, we shall offer a few general suggestions on joining metals, avoiding more detail than is absolutely necessary to make our meaning explicit.

Soldering.—One of the processes in most constant requisition in working with metals is soldering. As a general principle of primary importance in soldering, it is necessary that the solder with which a joint is to be effected should be fusible at a lower temperature than the metal to be joined. Without attention to this point, it will readily be seen that the heat applied to effect a joint would frequently injure or destroy the article under manipulation. It is also generally desirable, as far as possible, that the solder should be similar in colour to the metal to be joined. To meet these requirements, various kinds of solder are used in joining different metals: the one to which, however, we shall chiefly direct attention as simplest and easiest to manage, whilst it will answer most of the purposes of the amateur mechanic, is known as "soft solder." Various recipes are given for making it; it is usually composed, however, of two parts of tin, and one part of lead: where the most fusible solder possible is required, the compound should consist of three parts of tin to two of lead. Solder, ready prepared, can be purchased in rods of the whitesmith, and this will be found, for the most part, the best method of procuring it; where, however, it is inconvenient to purchase it ready prepared, the amateur may mix the metals in the proportions indicated, and melt them in a common iron spoon, either over the flame of gas or in the fire. It may then be poured out on the hearth, and drawn by the spoon into rods of convenient form for use.

In all soldering processes, it is necessary to add something to assist in the fusion of the metal, which is known as the "flux." In using soft solder, either common resin or chloride of zinc are generally used as fluxes. To prepare the latter, a wide-mouthed bottle is half filled with hydrochloric acid, and into this is thrown a few fragments of zinc: this should be placed in the open air until effervescence has ceased, as the fumes given off will be found noxious in a room. To be assured that no free acid is left, a few pieces of zinc should remain undissolved. The preparation is then ready for use, and will keep good for any length of time.

The exact mode of procedure in effecting a joint will much depend on the shape and nature of the article. To take a common illustration, suppose two pieces of lead or brass pipe are to be joined, the ends of both are to be well cleaned by scraping or filing; one of them is then covered with a little powdered resin, and a small piece of solder is to be laid upon it, and then submitted to sufficient heat, when the solder will run over, and coat the whole of the cleaned metal.

There are various modes of applying heat in soldering: it may be effected either by a sufficiently large flame, a smaller flame and blowpipe, or the "soldering-iron." The latter, although called an "iron," consists of a piece of copper attached to a piece of iron, which is held in a wooden handle. It is sometimes called a "soldering-bolt." Its end, for use, should always be tipped with the solder. To effect this, the copper should be filed clean and heated; its end should then be rubbed on a piece of sal-ammoniac. On applying it to the solder, it will at once be coated. Care should be taken, in the subsequent heating, not to burn off this tinned point, or it will be necessary to repeat the process. Experience alone will enable the manipulator to determine the amount of heat necessary. Just less than a red heat will generally be sufficient. The flame of gas, where available, will be found very convenient, being comparatively free from smoke, and giving great heat. A common method of securing a sufficient flame, among plumbers, &c., is by the use of a bundle of rushes dipped in tallow, such as are used in making rushlights; these, with the aid of the blowpipe, give a very effective flame. The use of the blowpipe, which we have described in previous chapters, will be found frequently of great service in soldering, as a jet of flame directed by the blowpipe melts soft solder almost instantly.

To return to the joining of the pipe of which we were speaking: if any part of the scraped metal become smoked, it will be necessary to throw on such part a little more powdered resin, and the heat again applied, using, if necessary, a piece of brass or copper wire to spread the softened solder over the part. If the smoking is not considerable, this will be sufficient, but sometimes it may be necessary to begin afresh, cleaning off and re-scraping the smoked part, again adding resin and solder and applying heat. When a coating of solder is applied, whilst it is still soft, it is to be rubbed with a piece of cloth, and all but a thin film or coating is to be removed. By some skilled workmen the metal to be soldered is first dipped in tallow, then in the powdered resin, and the solder and heat are applied. The second piece of pipe, which should, by the way, be slightly flanged or opened out, so as to admit of the end of the other being inserted, is then treated in the same way. The two are then again covered with powdered resin and a little solder and placed together; the heat being then applied, the solder melts and runs into the joint in a few seconds.

The process will be very nearly the same if chloride of zinc be used as the flux instead of resin. In this case the trouble will be a little less, and the solder will more rapidly flow; but it is thought by some that the joint is not so strong.

In some cases difficulty is experienced in holding pieces of metal in firm contact during the process of soldering. They may sometimes be held sufficiently firm by the aid of a small vice—an article almost indispensable to the manipulator in metals. In other cases, slightly riveting previous to soldering, will be desirable; or, where the circumstances admit of it, binding by means of fine wire will be found efficient. Perhaps the most efficient method applicable in the greatest variety of cases will be found in supports of wire bent together in the form of a staple. For this purpose, iron wire should be used; it should be cut in short lengths with a pair of cutting pliers. These lengths are to be bent up into a form somewhat resembling the letter U, of such a size as will hold the two pieces of metal to be joined; a few of these being prepared and bent sufficiently close to hold the two pieces of metal to be soldered firmly together. The ends to be joined are then to be scraped or filed perfectly clean, as we have before described. In cases of this kind, the chloride of zinc will be a more convenient flux than resin; the parts to be joined being moistened with the solution, the wire supports are to be arranged so as to hold the pieces firmly, and a few fragments of solder being laid on the joint, the heat of a flame or soldering bolt being applied, the solder will run and attach itself to all the metal to which the chloride of zinc has been applied. After cooling, the superfluous solder may be filed or scraped away with a knife.

A small soldering bolt may generally be purchased for a trifle; where one is not at hand, however, and a suitable flame for melting the solder is not convenient, a piece of brass wire sufficiently stout to retain the heat, may be used; it being necessary, of course, to tip it with solder, as before described. A wooden handle may be attached to the brass, or what is, perhaps, better, it may be wrapped with several thicknesses of string to form a non-conducting handle.

Various kinds of hard solder are used, their composition varying with the metals to be joined, and the colour thus rendered desirable. The flux will also vary with the composition of the solder, borax being used with several kinds of hard solder. The use of the blowpipe will be generally necessary to effect a junction with hard solder, the heat of the soldering-bolt being insufficient. As we have before remarked, soft solder will generally best serve in all the operations of the amateur. For the purpose of aiding those, however, who are anxious to experiment further, we will add one or two remarks on the composition of hard solders, used for joining brass, &c. Hard solder for brass is made with eight parts of copper and one of zinc. The copper is first melted in a crucible, the zinc, in the meantime, being heated. When the copper is melted, the hot zinc is thrown into it, and, the crucible being covered up, the whole is shaken together. In a few minutes, it is poured out into a vessel of cold water. In order to granulate it, the twigs of a birch broom are held over the water, and the metal, passing between them, is divided into grains as it drops into the water.

In making hard solder, it should be borne in mind that it is harder and less fusible, in proportion as it contains more copper. A somewhat softer and more fusible hard solder is made of six parts of brass, one of zinc, and one of tin. The brass is first melted, the tin then added, and, lastly, the zinc, which should, as before described, be previously well heated. The whole, being then well agitated, is to be granulated and cooled, as before described.

The parts to be joined are to be scraped or filed perfectly clean, and a portion of the flux—borax dissolved in water being commonly used—added, with a grain or two of the solder; the whole is then to be submitted to the flame of the blowpipe, until it runs. In some cases, a support of charcoal is used, by which the heat is maintained. A well-soldered joint, managed in this way, is often little less strong than the metal itself. It is, of course, to be cleaned off and trimmed, in the usual manner.

(*To be continued.*)

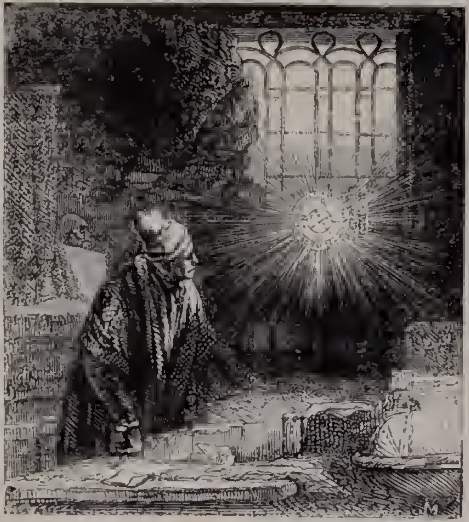
ON COMPOSITION AND CHIAR-OSCURO.—XII.

BY MR. LAKE PRICE.

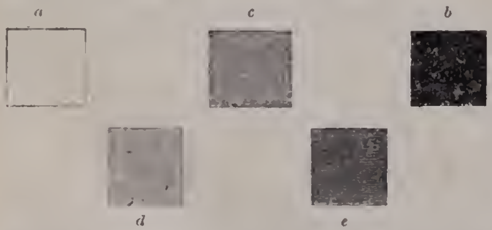
"Hail, holy Light! offspring of heaven first-born;
Bright effluence of bright essence increate."—MILTON.

"Come, thick Night,
And pall thee in the dunnest smoke of hell!"—SHAKESPEARE.

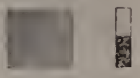
CHIAR-OSCURO* in Art is a quality of the utmost importance. By the due employment of its resources most of the sentiment of a picture is given; expressing, by the judicious application of its powers, not only the endless varying effects seen in nature, as the hazy light of dawn, the dim shades of evening, the gloomy grandeur of the threatening tempest, or the bright cheerfulness of open sunshine, but also giving reality and consistency to the outline. Its relation to linear composition is as the muscles are to the bones in the human frame; whilst upon the taste and judgment displayed by the artist in the arrangement of his light and shade, the "breadth of effect" of his picture entirely depends. By this arrangement of light and shade he is also mainly aided in antagonising the effect of the *flat* surface upon which his representation is made, and, according to his skill in availing himself of its varying combinations, the idea of *depth* and distance from one object to another is created and sustained.



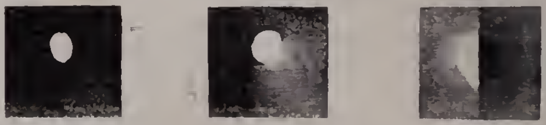
The full exposition of its powers is seen in the works of the great magician of chiar-oscuro, REMBRANDT, in whose works *forms* sometimes really ignoble in drawing, and deficient in every feeling of elevation of conception, are, by the sheer force of a wondrous light and shade, surrounded by a mysterious grandeur, or clad with a poetic feeling, which causes the beholder, in his rapt admiration of those qualities, to overlook their other deficiencies.



In Art, light is represented by white, *a*, absolute dark by black, *b*, the medium tint being termed half tone, *c*. There are, besides, the distinct intermediates from half tone on either side, which are called "*light* half tones," *d*, or "*dark* half tones," *e*; and it is mainly upon the *proportions* and *oppositions* of the various *nuances* of these tones in the chiar-oscuro of a picture, that (apart from form and colour) its verisimilitude and sentiment depend. Thus, in representing large open expanses of plains, sands, &c., the qualities of *space*, *sun-light*, and atmosphere, are best represented by the *mass* of the picture being composed of half tones and light half tones, *f*, with *small portions* of dark and white, *g*, in immediate juxtaposition, especially in *foreground* objects; thus giving clear brilliancy, and, by the power of their opposition, distance and atmosphere to the half tones. The W. Vandervelde, (vol. iii. p. 385) illustrates the principle, and by no painter has this class of subjects, namely, clear, clean sunshine, and open daylight effects over sands, water, &c., been treated with greater success; the nature of his chiar-oscuro being always very similar. The effect of omission of the smart oppositions (*in small proportions*) of black and white would be, that monotonous half tints would pervade the picture; it would lose its sparkling freshness, and, wanting the *scale* of gradation of tones, be deficient in atmosphere. The contrasting extreme, in pictorial representations, are subjects of sombre interiors, gloomy forest scenes, &c.; here the proportions of light and shade must be largely altered, that the appropriate sentiment may be attained. In the Rembrandt in the opposite column, we find more than one-half of the picture occupied by dark, about a quarter by half tones, and one-fifth by light; and we shall have occasion to see that the limit of privation of light, for such subjects, is not by any means reached in these proportions, but that much less suffices to Rembrandt, in his "dark pictures."



It is not sufficient that the light in a picture should be placed as a spot, *h*, in a mass of dark; it must be disseminated and led into the depths, *i*, whereby it is gradually broken, leaving, however, a portion intact, to contrast vigorously with the shade, thus giving both a greater value. Neglect of this rule causes "spottiness" in pictorial effects; whilst "breadth of effect" results from its being observed. Reference



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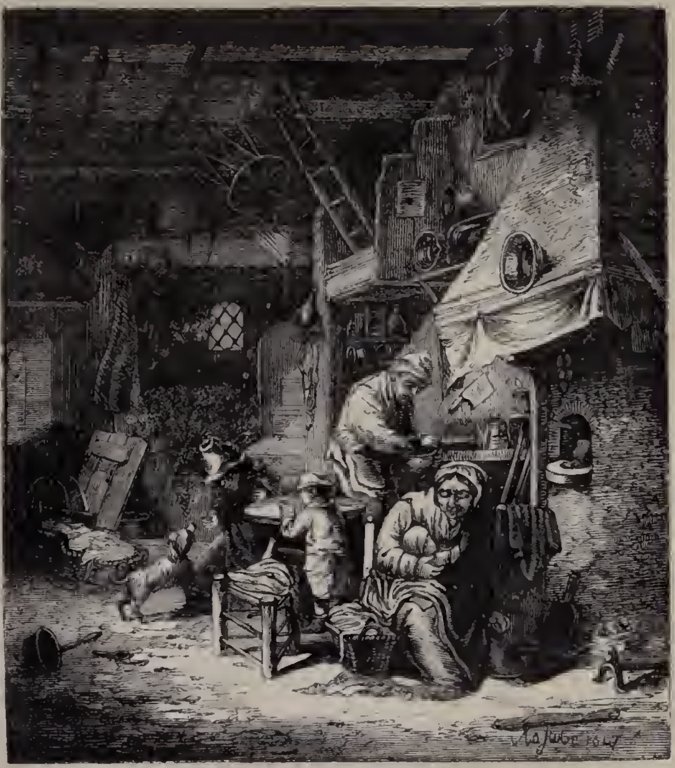
* CHIAR, light; OSCURO, dark; (Italian) pronounced *Kiar-oscooro*, has always been the term used in Art for light and shade.

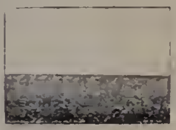
to the Sir Joshua, vol. iii. p. 367, will show the illustration of the principle. The resources at the disposal of the artist are small, compared with the results he is called upon to produce, namely, to simulate, with mere earthy pigments, actual, radiant, effulgent LIGHT; and on the *flat* surface of canvas, distance, or, as in skies, illimited SPACE; therefore it behoves him to say, with Laertes—

> "And, for my means, I'll husband them so well,
> They shall go far with little."

Every care, therefore, must be taken to enhance, by opposition,* the brilliancy of his lights and depth of his darks. This principle is seen carried out in all good art; the highest light and principal dark are brought into clear, *j*, juxtaposition. If a portrait, the face against a dark hat, or dark hair, or the intense point of background shadow; in landscape, the main light of the sky contrasting with a darker object, as in the Claude and Cuyp, vol. iii. pp. 385, 406; or if not an effect of sunset or sun-down, resorting to other means to effect the same end, as seen in the Turner, vol. iii. p. 384. The "Interior," by Jan Steen, on the preceding page, illustrates the principle; the background is composed entirely of half tones; the dark of the foreground boor coming off the light woman's dress beyond, gives the contrast, whilst the gradations of light and of dark meet in a focus at this point. Not only does this principle hold good for the *general effect* of a picture—it should pervade every light and every shadow in it, which ought not to be monotonously flat, but be intensified at the point of contact, by which means their power is mutually increased.



The picture being divided either longitudinally, *k*, as in landscape, or diagonally, into light and dark, the light must be carried into the dark portion, the dark into the light of the picture, whereby the crudity of their division is broken up. They are *disseminated* and repeated over the work, and breadth of effect and a picturesque play of light ensues. Thus, in landscape, a river, lake, road, pond, &c., brings down the light from the sky, and trees carry up and spread the darks and half-darks into the light, making at once, as shown in the cut, *l*, in its simplest elements, good chiar-oscuro.



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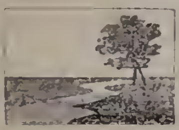

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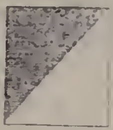

m

The above fine interior, by Ostade, illustrates the principle; the main division of light and shade is commenced on the diagonal, *m*, of the subject; but Ostade at once carries the darks down by heavy shadows on and from the figures into the light portion, and light and half-tones into the dark, in the most natural manner possible. This subject, both in its lineal composition and masterly chiar-oscuro, is one of the most perfect interiors extant, and, as such, should be carefully studied.

(*To be continued.*)

THE LIME LIGHT.—The lime light may now be seen on Westminster Bridge, which is entirely illuminated by it. In point of intensity, brilliancy, and steadiness, the light far exceeds our expectations, and may be considered as perfected.

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 30*th April*, 1860.

I SEND you an account of a new dry collodion process just made known by M. Peschard, which has some strong claims on the attention of photographers.

At the last meeting of the Academy of Sciences, an interesting note was communicated by M. A. Rigault, on the fermentation of mucic acid. This product—which, as is well known, is derived from the action of nitric acid upon various gums—resembles citric acid in one or two remarkable points. Thus, both these acids have very nearly the same composition; mucic acid contains the same elements as citric acid crystallised with two atoms of water. When submitted to the action of fusing potash, they both break up into one molecule of oxalic acid and two molecules of acetic acid. But what would tend still more to establish the identity of the molecular arrangement of these two acids, would be to prove that they ferment in the same manner. Now, some time ago M. Personne showed that, when citrate of lime was fermented with yeast, it gave, as products, butyrate and acetate of lime. M. Rigault has just proved that the same transformation takes place when mucate of lime is submitted to fermentation. When put in contact with the muscular flesh of fowl (the substance which appears to establish this fermentation of mucate of lime in the most satisfactory manner), this salt is transformed, after 12 days of fermentation, into acetate and butyrate of lime; at the same time, carbonic acid gas and a little hydrogen are evolved. This fermentation takes place at + 25° to + 35° (centigrade); it is necessary to add a little carbonate of lime to the mixture, in order to saturate completely the acid products as they form.

This transformation is very interesting in a practical point of view; it is known how easily mucic acid is derived from gums by the oxidising influence of nitric acid. It is, moreover, shown in this paper of M. Rigault's, how closely mucic and citric acids resemble each other; it may, therefore, be reasonably hoped that, one day, citric acid will be artificially produced in the laboratories.

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* The effect of opposition is very visible by drawing a square or circle with a moderately thick black line on white paper; the inclosed part appears so decidedly *lighter* than the rest of the sheet, that we can hardly believe it to be the same white.

We have also another excellent paper, by M. F. Musculus, read at the same meeting—"Remarks upon the Transformation of Amylaceous Matter into Glucose and Dextrine." The author cannot admit that glucose results from a simple absorption of water by starch; it appears to be, on the contrary, the product of a complete decomposition. Here are some of the facts brought forward:—On digesting starch with diastase (germinated barley), it is found that glucose and dextrine are produced simultaneously, and always in the same quantities; diastase has no action upon dextrine. Diluted sulphuric acid acts like diastase at first, but afterwards the action continues upon the dextrine formed. At all events, when sulphuric acid is used, glucose and dextrine appear together, and in the same quantities as with diastase. Now, here are the practical conclusions to which the author has been led:—

1st. In the manufacture of glucose (now so extensively used in beer and wine making), we generally consider the re-action of the diastase or the sulphuric acid on the starch or fecula as terminated when the liquid no longer becomes blue with tincture of iodine, or when no precipitate is produced by alcohol. Now, a large quantity of dextrine remains mixed with the glucose in the liquid, and as the former does not ferment with yeast, its presence causes a great loss to the manufacturer. If the latter desires to obtain a better product, he must use a higher temperature by employing an hermetically-closed vessel.

In the author's laboratory experiments he used a strong closed phial, which was submitted to a heat of 108° (centigrade), in a boiling solution of water saturated with salt. In this process, the quantity of glucose obtained with sulphuric acid is three times greater than that obtained by the ordinary process.

2nd. The manner in which dextrine resists the action of diluted sulphuric acid in open vessels furnishes us with an easy method of estimating the relative quantities of cane-sugar and dextrine that may be present in a liquid: an ebullition of one minute suffices to transform all the cane-sugar into glucose, which may be then estimated with cupro-tartrate of potash; whilst the dextrine remains unchanged.

3rd. The enormous quantities of germinated barley which the brewers are obliged to employ to produce a liquid tolerably rich in alcohol, is now accounted for: two-thirds of the fecula or starch employed pass into the liquid in the state of dextrine. This product has, however, the advantage of giving a certain consistency to beer which is appreciated by the consumers.

4th. In the manufacture of brandy, or spirits of wine, by means of grain, there is a certain loss of two-thirds in the ordinary manner of operating.*

I wish it were in my power to give you every week the results of such valuable researches as those which form the subject of the two papers I have just analysed.

PRAISE TO WHOM PRAISE IS DUE.

SIR,—Permit me to direct the attention of photographers to a very reprehensible practice, which is gaining ground among photographers generally, and is no longer confined to that school of artists who think themselves, *par excellence*, the photographers of the age. The self-sufficient gentlemen composing that school seem to be of opinion that "nothing good can come out of Nazareth," or rather France, for they systematically decry, and say "naught" to every photographic suggestion or discovery made by Frenchmen. For instance, the original and valuable researches of M. Niepce de St. Victor were suppressed in favour of the erratic and inconclusive lucubrations of certain transcendental photographers, who make it a practice to claim the originality of every discovery in photography, past, present, and to come. Again, in a late number of one of your contemporaries, M. Fordos's examination of the respective merits of the different preparations of gold for toning was seized upon. This gentleman, who has rendered some service to photograpby, made no claim to discovery; he merely stated that he thought the double chlorides of gold and sodium, and of potassium, were safer and more economical than *sel d'or* and ordinary chloride of gold. But he was upbraided with his presumption in thinking that he, a Frenchman, could tell one of our self-sufficient *photographers* anything he did not already know. Poor M. Fordos! where is he now? Yet, I remember, his fate is not nearly so cruel as that of Messrs. Davanne and Girard. I need not say how much photographers are indebted to those gentlemen for their intelligent and laborious researches into the philosophy of positive printing. But when they touched upon hypo. they were unceremoniously contradicted by our photographers, *par excellence*.

Now, sir, in the present state of photographic printing, I think it safer and wiser to abide by the assertions of the French chemists, than by those who have unceremoniously contradicted them. If the Frenchmen are in error—which I am not disposed to admit—they certainly err on the safe side, and we shall run no risk in adopting their dictum. Our positives fade, and our self-sufficient gentlemen have never told us the causes, nor done anything towards putting us on a safe track. To whom, may I ask, are we indebted for that (empirical) "toning and fixing" formula once so much in vogue, and to the employment of which we are indebted for most of our faded pictures? It is true that formula has been modified, or, rather, abandoned, within a year or so; but the hint for that revision did not come from the "school," although they quietly adopted it, and brought out the new formula, lightly disguised, *as their own!* We may, in my opinion, safely abide by what the French chemists teach; *they* generally know what they know, and do not shift their position with every side-wind that blows. In looking over the annals of photography, I am impressed with the fact that most of what we hold as truly valuable in the art has come to us from France—the daguerreotype, albumen, collodion, waxed-paper, iodine, pyrogallic acid, &c. &c. Surely, we ought to be grateful, and not ridicule or slander those from whom we have received so many valuable hints.

A VETERAN PHOTOGRAPHER.

Proceedings of Societies.

PHOTOGRAPHIC SOCIETY OF LONDON.

THE ordinary monthly meeting of this Society took place on Tuesday evening, May 1st, at King's College; H. WHITE, Esq., occupied the chair.

The CHAIRMAN, on taking his seat, expressed his regret at the absence of the President of the Society, who, the meeting had been led to hope, would be present on the occasion.

The minutes of the last meeting having been read and confirmed,

Mr. HARDWICH read a paper "On the Value of Collodion as a Photographic Agent," which we shall publish next week.

The CHAIRMAN said, it had been arranged that the discussion on the report of the Collodion Committee should be resumed at this meeting, and the paper which Mr. Hardwich had previously read might fitly be made the subject of discussion also. He (the Chairman) would be happy to hear the remarks which any member might have to make.

A pause ensuing,

The CHAIRMAN called upon Mr. Malone, who on a previous occasion had expressed a wish that the discussion should be resumed.

Mr. MALONE observed, that though he was anxious that this subject should be more fully discussed, he was not desirous of opening the discussion. If he remembered rightly, Mr. Mayall had proposed that the discussion be resumed, and he had expected to see Mr. Mayall present on that occasion. (Hear.) In his absence he (Mr. Malone) felt himself at a disadvantage in re-opening the discussion. (Hear.) He should, therefore, place himself in the hands of the meeting, and should sit down, with the view of responding later in the evening to any inquiries or statements that might be made by others.

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* The price of the potato-starch used in these operations is becoming so high in some countries, that a few years ago (in 1855) a prize of 10,000 francs was proposed by the Belgian Government, to be awarded to the person who would find out a substitute for this valuable alimentary substance in the various manufactures. This circumstance gave birth to the publication, at Brussels, of a pamphlet entitled, "*Memoire sur la Fécule et les Substances qui peuvent la remplacer dans l'Industrie*," in which the whole question is discussed, and various remedies proposed; among others, the cultivation of maize as a source of starch. In this work, the author describes some experiments made with a view of transforming wood (cellulose) into starch by the action of sulphuric acid; but with only partial success.

Mr. V. **Heath** rose merely to say that he was convinced Mr. Mayall's absence was due to some mistake. Mr. Mayall was assuredly not the man to treat the Society with disrespect, and he had distinctly moved the adjournment of this discussion. Possibly, both he and the President had been led into an error as to the day of meeting, in consequence of the first Tuesday in the month falling on the first day. Under the circumstances, he would ask whether the meeting could not extend its indulgence to Mr. Mayall, and adjourn the discussion once more.

The **Chairman** considered that as this was the last meeting but one of the session, and as Mr. Hardwich was present to meet all comers, it would be desirable to proceed with the discussion.

Mr. **Williams** (who was indistinctly heard) said, that he had tried Mr. Hardwich's formula without success. He had strictly observed the proportions stated; the temperature was right, and the result was an entire failure, the cotton, on being placed in the acids, having dissolved entirely. Mr. Hardwich would, perhaps, be able to explain what was the cause of failure. Had he (Mr. Williams) been the only person who had failed with this formula, he should scarcely have ventured to say so much as he had said; but he did not stand alone. A well-known maker of collodion had told him, that he had entirely failed to produce a collodion by Mr. Hardwich's process; and he could mention another case, if necessary, in which a similar result had been obtained. What was the cause of failure? It was fair to say that the proportions in Mr. Hardwich's formula were entirely different from those which he had been accustomed to use (hear, hear), and therefore he might have made the experiment with some little prejudice against the formula.

Mr. **Malone** said, that as the discussion had taken so important a turn from the statements of Mr. Williams, he might, perhaps, now be permitted to say that the very first time he (Mr. Malone) tried Mr. Hardwich's process he succeeded perfectly. There was certainly an extraordinary discrepancy, for which it was impossible for him to account, between his experience and that of Mr. Williams. In order that there might be no mistake about the matter, he would state exactly what he did. He took one measure, or one fluid ounce of nitric acid, and ascertained the specific gravity of that acid—first proving his specific gravity bottle to be correct. And here he might observe that there was nothing of greater importance in conducting delicate manipulations of this kind than a scrupulous care in testing the apparatus employed. For example, on weighing water into the ounce measure which he had intended to use, he found that 7 drachms weighed one ounce avoirdupois, so that the ounce held a drachm more than it ought. Then, having got just one fluid ounce of nitric acid, the specific quantity of which he ascertained by experiment to be 1·446, or by the more correct balance in the laboratory of the London Institution, a little higher—say 1·447 or 1·448—he added to it 3 fluid ounces of sulphuric acid of the specific gravity of 1·842 or 1·844. The consequence of this specific gravity was, that the acids were rather weaker than as recommended by Mr. Hardwich. Having mixed them together, 1 to 3 in volume, 7 fluid drachms of water were added. The actual temperature of this mixture was full 180°. The acids were allowed to cool to 150° by one thermometer, and to 148° by another, the latter being nearer the truth. These variations were stated to show that the process was not one of chance, and that unless persons who attempted to make collodion took these precautions they might be misled. The mixture being allowed to cool, as stated, he put into it 50 grains of cotton, allowed the cotton to remain in it ten minutes, which reduced the temperature three or four degrees, then took it out and threw it into water—in fact, the simplest process in the world. (Mr. Malone produced a portion of the 50 grains of cotton to which he alluded.) It was said that if the operator got out 50 grains he ought to be satisfied, but he (Mr. Malone) got out 68 grains. But Mr. Williams and some others to whom allusion had been made had got out nothing. How was this to be accounted for? No doubt the managers of the London Institution would allow their laboratory to be used for the purpose, as they had done before, and he should be happy to repeat his experiments before any competent person, in order to place the matter beyond dispute. His own success was not due to any intercourse he had held with Mr. Hardwich, although Mr. Hardwich had been very kind in the matter. Any person could produce as good a collodion with this formula as he had done, if they would take the same precautions to insure the accuracy of their manipulations. The action of these acids at a given temperature upon a given body was a definite action. Every chemist knew that it must be so. Possibly the failure in the experiments of Mr. Williams and others—supposing the purity and temperature of the acids to be correct—might lie in the cotton, which was an article of very various quality. It was very difficult to determine what was and what was not cellulose. Recently, in a work on agricultural chemistry, an attempt had been made to define cellulose, in a rather curious way. It was stated that all the vegetable substance which did not give way under acids was considered to be woody fibre, and all that did give way was probably the portion which constituted food. Mr. Hardwich stated that he had used a certain cotton wool grown in an American State. He had, therefore, done the only thing which, under the circumstances, he could do. When cotton was obtained, it was impossible to state how far it had been contaminated with oil or other impurities. The chemist should take nothing for granted, and should treat the cotton with acids and alkalies, in order to get something as definite as possible. If cotton were treated with caustic potash, and showed a yellow colour, it did not dissolve in acids which otherwise would have dissolved it. Supposing the cotton fibre to be right, the weakness of the acids might possibly cause the solution. The cotton might be wrong; it might not be perfectly dry, or there might be an error in the acids. The process, it would be observed, was very nice, but with nice instruments it was easy work. The cotton having remained in the acids ten minutes was taken out, the temperature being ascertained by one of Mr. Newman's thermometers; and here it might be remarked that a standard thermometer was a very valuable instrument—Mr. Newman, he believed, valued his at twenty guineas. He (Mr. Malone) did not say that every one was to give twenty guineas for a thermometer, but he strongly advised them to have their thermometers tested by a standard instrument, and at Kew Observatory there was a convenient arrangement for doing this. The cotton (the portion exhibited) was not particularly rotten, as would be observed. He took five grains of that cotton and put it into half an ounce of alcohol of 0·806 distilled off chloride of calcium, and ether of 0·725. Although he should be sorry to convey the idea, that in the manufacture everything must be absolutely pure, yet, if the acids or ether were imperfect, and contained any oxydised or ozonised substances, the result would be unsatisfactory. The ether, Mr. Hardwich believed, should be alkaline, or at least he had found it so, while he (Mr. Malone) had been told by a very eminent chemist, that it should be neutral. The cotton was washed some hours in ordinary water. Theoretically, he should of course recommend distilled water, but in practice this was not found to be necessary; and he agreed with Mr. Hardwich, that it was undesirable needlessly to refine upon a process. Then, 5 grains of this pyroxyline being dissolved in alcohol of 0·805 and ether of 0·725, was sensitised with 2 grains iodide of potassium and 2 grains iodide of cadmium. It had been observed, that frequently good iodide of potassium was obtained from one chemist, while it would be necessary to go to another for good iodide of cadmium. This showed the necessity for personal superintendence, to secure which an adequate price must be paid for the chemicals. (Mr. Malone here placed a portion of the pyroxyline which he had brought, in a mixture of the ether and alcohol, and it dissolved perfectly.) The pyroxyline, which, as had been observed, dissolved readily in the ether and alcohol, produced a perfectly clear and tenacious film, and he had stood it under the tap without injury. Such was the collodion resulting from the formula given by Mr. Hardwich; and because the Committee, believing it to be a valuable article, had thought fit to give it the stamp of their approval, the Society had been taken to task by a neighbouring Society, who had told them that they did not know what they were about. He (Mr. Malone) asserted, on the contrary, that they knew perfectly well what they were about. No one, except Mr. Hardwich, had given them that minute information in reference to a formula for a good collodion, which he (Mr. Malone) had used, and which any one might use, with success. He hoped he was breaking no confidence if he said that Mr. Hardwich had felt rather galled at remarks which were made in some quarters three or four years ago. One person, for instance, had said at that time, "Oh, if it were not for my collodion, photographers might shut up shop." No doubt that person manufactured a good collodion; he had been very lucky to hit upon a good article "by rule of thumb;" but, if he were to shut up shop to-morrow, photographers would be able to obtain all that they required through pursuing the directions given by Mr. Hardwich. The reason the Committee published their report was, that they found they had really got a good thing. He (Mr. Malone) thought that the Committee might have acted kindly in not bringing forward all the points which struck them in reference to the other formulæ sent in. They had one laid before them, from which it appeared that the sender had not quite made up his own mind about it. He suggested that the Committee should try this or that, in working out his formula, but this was not the business of the Committee. They had no time to assist persons in perfecting formulæ, but they were simply to examine the formulæ as sent in. The Committee, therefore, could not deal with this formula. Another which was sent in presented a fundamental objection, for he believed that any formula which recommended paper as a material for pyroxyline ought not to be considered. Swedish filtering paper was named, as containing a very good cellulose; but any one conversant with the manufacture of paper, as he (Mr. Malone) happened to be, must be aware that it was impossible to say what were the constituents of a particular piece of paper, or how far they might differ from those of another piece, nominally of the same manufacture. It was simply a heterogeneous mass which was recommended, some parts of which might be soluble, and others not so. He knew a gentleman who, having succeeded in making collodion with Swedish paper, sent for more paper of the same manufacture, and entirely failed: the second paper, in fact, was quite different from the first. With regard to the sensitiveness of Mr. Hardwich's collodion, different statements had been made: one gentleman stated, in the body of the report, that he had obtained a collodion twice as sensitive. The Committee had been called to account for what was termed the contradictory nature of their report, when, in fact, the record of different opinions showed only their perfect honesty in the matter. He did not doubt that that member of the Committee had stated what he believed to be true, but he was satisfied that he could not produce before them such a collodion as he had described. If a collodion could be produced twice as sensitive as that of Mr. Hardwich, it would be advertised from one end of London to the other. He (Mr. Malone) had been anxious that the valuable labours of Mr. Hardwich should be properly appreciated. He had given them many valuable facts, and a collodion—he would not say better—but as good as any other. Those persons who made collodions would, if they were candid, admit that they had to encounter many difficulties from the uncertainty of the processes they used, and he believed it would ultimately be found that Mr. Hardwich had given the clue to enable these parties to produce this article with certainty. He would only further express his confidence that the Committee would be glad to consider any other formula that might be laid before them, and which, in the opinion of competent judges, might be deemed worthy of consideration. (Hear, hear.)

Mr. Hardwich wished to say a few words at this period of the discussion. He should be extremely sorry to think that this was a formula that any practical man could not succeed with. Mr. Williams had tried it and failed, but there were circumstances which might account for this. Mr. Williams mentioned in a letter to him written on matters of business, that his personal superintendence was so much required in the manufacture of other chemicals, that he could not pay sufficient attention to collodion to enable him to speak positively. He had, however, tried the new formula once, but not very carefully. He (Mr. Hardwich) heard Mr. Hocken's name mentioned, as one who had failed with this formula. He knew Mr. Hocken, and was satisfied that if he made up his mind to go into the matter he would succeed. Mr. Hocken had a collodion of his own, which he considered to be a better one, and therefore had not carefully tried the other. Mr. Malone had gone to work in a philosophical manner, and had experienced no difficulty; but he was quite sure that Mr. M. did not mean to convey the impression that the formula was so ticklish, that it would certainly break down without these extraordinary precautions. (Mr. Malone: No, no.) Everything which had been published as yet about this formula was against it; but the meeting was not, therefore, to suppose that nobody had been successful. On the other hand, letters had been written to Mr. H., reporting success on the first trial; but it often happened that failures found their way into print, whereas successes did not. He had no doubt about the formula being a possible formula, and therefore the question, he apprehended, for the Society to consider was, whether this formula gave better results than any other known formula; for, if it did not, why should they trouble themselves about it? The manufacture required delicacy, doubtless, but not more than a maker who cared to produce the article would be willing to give. The question had been put to him by Mr. Williams, why did the cotton dissolve in the acid? If the whole of the cotton entirely disappeared, he should say there must have been an error in measuring the water or the acid. But if only a part of the cotton dissolved, and, say, a *quarter* of it could be got out, this might depend on the sample of cotton being imperfectly cleaned, or upon chlorine in the acids. He found that the more water he used in the acids, the better was the collodion. If made with very little water, some small defects—perhaps a streak here and there, or something of the kind, which the amateur would not see, but which professional photographers did see—were apt to occur. If the amateur failed with the formula as published, let him work with less water, and he would produce, with great certainty, a very respectable collodion. The point, he repeated, for the consideration of the Society, was simply whether the formula was worth all the trouble which had been bestowed upon it.

Mr. Williams said that his experiment had been made without that care which he should have used, had he known that the subject would come before the meeting. He only rose because the Chairman invited him to do so; and he did not consider that his experiment settled the question.

Mr. Malone said that if his remarks had been unusually warm, the feeling was caused by the circumstance that persons elsewhere had stigmatised the Society in its own Journal in a most extraordinary manner.

Mr. Vernon Heath said, it might be his misfortune that it had fallen to his lot to originate this discussion. On the former occasion he hoped he had expressed himself in terms fully justified by the circumstances, friendly towards Mr. Hardwich, and couched in a tone which he trusted he should always use in that room. (Hear.) He therefore hoped that the remarks of Mr. Malone did not apply to him. ("No," from Mr. Malone.) At the same time, he must say that he had heard nothing since which induced him to alter one single expression which he then made use of. He believed this subject was still misunderstood. He had previously stated, and he repeated it, that he had the highest opinion of Mr. Hardwich's collodion. But, remembering how and for what purpose that Committee was formed, not to consider the best method of making collodion, but to consider Mr. Hardwich's collodion—— (No, no.)

Mr. Malone said that was the original intention, but it was modified to admit other formulæ.

Mr. V. Heath said, Such was the case, but why was the resolution modified? Evidently because in its original form it could not be entertained. And if so, why was Mr. Hardwich's collodion placed in its present prominent position? He would ask Mr. Malone whether he thought it probable that men whose trade lay in the manufacture of collodion would come forward and publish their formulæ? It did not follow that because Mr. Hardwich's collodion was good, there was none equal to it. If the apparent injustice caused to some persons by the report could be removed, if the grammatical error of using the comparative degree where no comparison could be made, could be altered, and if the report could be regarded only as the report of the gentlemen who signed it, and not as pledging the Society to a particular opinion, let it remain on the Transactions of the Society, and let them at once make all the acknowledgments which were due to the labours of Mr. Hardwich. He (Mr. V. Heath) never had used that room, and never would use it, to vaunt other collodions. But Mr. Malone was mistaken in supposing that no more sensitive collodion was in existence because it was not advertised. He would undertake to produce Mr. Malone, any time he pleased, a collodion not only two to one, but three to one, more sensitive than that of Mr. Hardwich.

Mr. Malone admitted that the report was open to verbal criticism. The phrase "superior excellence" was objected to, and possibly the words might have been better chosen. He, however, saw no objection to using the words, although no comparison could be made, just as it was usual to say of a person that he was "a man of superior mind," simply pointing out his intellectual status, and without instituting a comparison between him and any other person. The Committee desired to convey the idea that the collodion was one of more than ordinary value. He would now say that he was no believer in a universal collodion; he believed that collodion would have to be modified to suit the work and the seasons. But as a normal collodion—if he might be allowed to use the expression—he had seen none equal to that of Mr. Hardwich. He must observe, that the strongest opposition came from those persons who were intimate with manufacturers of other collodions. It was desirable the Society should come to a decision on this question. Mr. Heath's criticism of the report was a verbal criticism. He (Mr. Malone) was quite willing to give up the wording. Let the report be put into a form which the Society could accept, for he considered that the Society ought to accept it, and to thank the gentlemen forming the Committee for their trouble. With regard to the challenge of Mr. Heath, he could only express his astonishment at the statement made. He threw back the challenge, and asked Mr. Heath to produce the collodion he had spoken of.

Mr. Heath said, the words "unsurpassed sensitiveness" also occurred in the report.

A Member observed that this was given only as the opinion of an individual member. (No, no.)

The Chairman, as a member of the Committee, thought it right to state that they had spent two hours in settling the wording of the report, and they all agreed that nothing stated in it should be withdrawn. The arrangements for furnishing the report were these:—As the occasions on which the members of the Committee could work together would be necessarily few, it was agreed that they should work separately. At the proper time, letters were simultaneously sent to them requesting them to send their reports in to Mr. Fenton, who incorporated their views in the report, and whenever a discrepancy occurred, quoted their individual sentiments. With regard to the sensitiveness of the collodion, the word "unsurpassed" was used; that was the opinion of the majority. [Mr. V. Heath: Not of all.] He (the Chairman) confessed that he saw no objection to the term, although there was no immediate comparison with other collodions. Persons engaged in such an inquiry would naturally compare this collodion with others which they might have used at different times, and if their opinion was decidedly favourable to Mr. Hardwich's collodion, they had a perfect right to say so. (The Chairman read the last paragraph of the report, in which the words "superior excellence" occurred, and observed that he considered the wording unobjectionable.) The expression was comparative and not superlative; it was not stated that this collodion was the best, but that it was one of considerable value. The thanks of the Society were due to Mr. Hardwich for the communication made to it, and there could be no impropriety in the Society receiving the report and stamping it with its approbation. As a member of the Committee, he did not feel inclined to withdraw a single word contained in the report.

Mr. Hughes said, that from circumstances of ill health, he had probably worked less than any other member of the Committee who had signed the report, and therefore he felt little hesitation in calling attention to the very emphatic remarks made by Mr. Heath on a former occasion, and repeated that night. In the report, the opinions of the individual members were fully expressed, for it was felt that a general laudatory report would do no good. Each person was required to give in his own report the defects which came under his notice, and these defects were noticed in the general report. The faults were thus noticed individually, while the merits were only generally expressed. By the observations made, however, it appeared that the very candour of the report tended to defeat its object, and that it was called contradictory, when, in fact, it was only just. Mr. Heath took exception to the appointment of the Committee.

Mr. Heath said he did not object to the appointment of the Committee. What he said was, that as the Committee had received no other formula than that of Mr. Hardwich, the object of its appointment could not be fulfilled, and it virtually ceased to exist.

Mr. Hughes would be sorry to have misrepresented Mr. Heath's statement, but he had certainly understood him to object to the appointment of the Committee, as well as to the making a report, while he stigmatised the report itself as contradictory and incorrect, because it had no regard for the vested interests of the makers of collodion. Suppose the Committee had taken the collodion of A. B., for example, and had compared it with that of Mr. Hardwich, and reported in favour of the former. Then they would have published a mere advertisement for A. B., because his formula was not made known; and if he died and took his secret with him, no advantage whatever would accrue to the photographic world. On the other hand, if they had reported unfavourably upon the collodion of A. B., they would have been doing him an injury. He might naturally complain that, having held himself aloof from the Committee, they should have thought fit to single him out for their express disapprobation. Was the Committee to surrender its functions because only one formula was presented to it, and did that formula come from a person likely to give a valuable one? That was the point. If he (Mr. Hughes) did not belong to the Committee, he would say that it included among its members some of the most eminent names in the various departments of photography; the members had worked hard for many months, and their observations were entitled to be received with respect by any Society, and especially by that Society. (Hear, hear.)

Mr. Hardwich would detain the meeting with only a very few further remarks. He did so, because he believed few persons understood his feelings in this matter. The discoverer of collodion, as every one was aware, was Mr. Archer; and all that he (Mr. Hardwich) and others pretended to do was, to effect improvements in minor details. For three years past he had been working a great deal with collodion, and had experienced many vexations. He had sent collodion to India, for example, some two years back, and had afterwards been informed that when it arrived it could not be used; this collodion was made from linen. The same thing had happened, though not in this instance with his collodion, in the case of a gentleman travelling in South Africa, to whom it occasioned a loss of six months' time. He (Mr. Hardwich) had consoled himself with thinking that as soon as the matter was settled, and he had obtained a sure formula for collodion, he would bring it before the Society. Had collodion been left in the state in which Mr. Archer left it, it would have been in a very unsatisfactory position. He (Mr. Hardwich) had no desire to set himself up as a martyr—one who had sacrificed his own interests to those of others. On the contrary, he fully admitted that he had been very successful commercially, and, now that the matter was settled, he invited the strictest examination of this formula. If the other collodion, stated to be three times as sensitive, could be produced, they would be in a much better position than at present, and he thought the Committee should take that collodion into their consideration, even if the maker did not give his formula. He himself, however, did not think it could be produced. This was the old difficulty of a difference of opinion amongst photographers, and it remained to be shown who was right. Not long since he had fallen in with a knot of amateur photographers, who were quite at a loss to understand why the Photographic Society of London should be vexing itself to produce a good collodion, whilst good collodions could be got almost anywhere. The Committee, however, thought differently, and believed that before the question of collodion could be considered as settled, every minute circumstance connected with its manufacture must be exactly determined. He (Mr. Hardwich) could understand individual members raising objections to this movement, without supposing them to be actuated by any inferior motives in doing so. [Mr. Heath: Hear, hear.] Although he had discontinued the manufacture, still he should be on the watch, and if any person brought forward the smallest improvement he should catch at it, and the result would tend to the general benefit. He allowed that there were weak points, such as the manufacture of ether. There were only three or four persons who made this article, and therefore the matter rested with them. He considered that the next step the Society should take, should be to ascertain what ether was, even if they spent £100 upon it. Another weak point was the cotton. He believed that all cotton chemically cleansed would be found to be alike; but this had not been actually proved. He was convinced that the inquiry which had taken place would result in good to the cause of photography. (Hear, hear.)

The CHAIRMAN announced that at the next meeting, Mr. Dalmeyer, son-in-law of Mr. Ross, would read a paper "On Distortion, as produced by the present Forms of Lenses, and on an improved description of Lens, free from this defect."

The proceedings then terminated.

Photographic Notes and Queries.

MAGIC LANTERN CAMERA.

SIR,—Perhaps you will allow me a corner in your "NEWS" to reply to your correspondent, "Apocryphal," with reference to his employing the *camera* as a *lantern* to exhibit *photographs.*

I don't consider myself to be an infallible genius, yet for two years I endeavoured—by all the plans and methods I could by any means devise—to succeed without much expense, but signally failed. In this communication I have no object in view, except giving my own experience, thereby preventing others from wasting their time and patience, only to end in bitter vexation.

If "Apocryphal" wishes only *a gas-light*, he may obtain a fair *disc* -say 7 feet diameter—which is very interesting for a private exhibition; and the best gas-burner for this purpose is Hart's patent tulip-jet, placing the edge of the flame towards your pictures. Simple as the difference in this alone may appear, yet, in my hands, it has been the most successful way of adapting the light. Before this can be done, some expense must be incurred, and the cost will be according to quality and maker of your requisites. First of all, your lantern should consist of a good, hard wood box, *or, if preferable,* tin, with a door on one side. Size of the lantern, 11 inches long, 8 inches broad, and 10 inches deep, with a draft or chimney in the centre, to carry away the heat and smell of gas.

Go to a respectable optician, obtain a pair of good compound 4½-inch condensers, with front and slide-holder, ready for screwing in your lenses. This is made of tin, then japanned, and is easily attached to your lantern. Either leave the front open, or cut a circular hole the size of your condensers. This part of it cost me £2 5s. Another hole must now be cut in the back of your lantern to insert the *burner*, with an arrangement to move the same, so that a good, clear disc may be got. This suits well for a time. But a desire to arrive at something much better and clearer induced me to illuminate my photographs with the oxyhydrogen light. The same lantern answers both purposes.

I have a few very good pictures of my own—transparencies—as also one-half of a number of stereoscopic transparencies that I purchased, only requiring one for my purpose. I should be glad to form a sort of Exchange Club of Photographs, properly mounted, and thereby increasing our stock of subjects by mutually assisting one another; trusting to the honour of each other; or by sending specimens to the Editor, who, I feel assured, would be willing to assist us, in a similar way, to the Exchange Club of Stereoscopics now in operation.

I inclose my address, and shall be willing to give, by letter, any information your correspondent, "Apocryphal," may wish.

Colne, April 19, 1860. T. R.

AMATEUR PHOTOGRAPHY.

SIR,—I read Mr. Howard's paper on "Amateur Photography" with great pleasure; I only hope many amateurs may take a leaf out of his book. To give you an instance of the way some amateurs work, I will describe a scene I witnessed last week. A very swell-looking gentleman, lady on arm, camp-stool in hand, approached me, preceded by what was evidently an avant courier, bearing a tripod; and, on looking back, I perceived that the swell-looking party had a camera fastened by a strap to his back. The avant courier proceeded to point out the best point for the gentleman's camera; focussed for him, and inserted a dry plate; timed the exposure; then packed up the apparatus, helping the gentleman to put it on his back;—yet this man will probably exhibit the resulting pictures (if there are results) as his own work. This is, in reality, bringing the art into sad disrepute. An amateur who really takes pleasure in the art will prepare his own plates, or, better still, use wet collodion, instead of buying ready-prepared plates, and then calling himself a photographer. I think a great part of the pleasure of photography is the knowledge that, when you get good results, they are derived from your own individual exertions; and my opinion is, that, with the exception of making his own collodion and preparing his own paper for printing on (albumenising, I mean, of course), every other part of the process ought to be gone through by the photographer himself, whether amateur or professional.

A WET COLLODION OPERATOR.

MEETINGS OF PHOTOGRAPHIC SOCIETIES.

Tuesday,	May	8—Photographic Society of Scotland.
Wednesday,	,,	9—Chorlton Photographic Society.
Thursday,	,,	17—South London Photographic Society.
Monday,	,,	21—Blackheath Photographic Society.
Friday,	,,	25—Photographic Society of Ireland.
Tuesday,	,,	29—Birmingham Photographic Society.
Wednesday,	,,	30—North London Photographic Society.

TO CORRESPONDENTS.

J. G. PERRY.—1, 2. Mr. Maxwell-Lyte's toning-bath consists of chloride of gold, 10 grs.; phosphate of soda, 3 drachms; distilled water, 1 pint. The prints, after toning, are washed, then fixed in solution of hypo. The portion of the gold solution used for toning must not be returned to the stock-bottle. 3. The number of prints the above will tone depends upon their size. 4. Pyrogallic acid, 3 grs.; citric acid, 3 grs.; water, 1 oz.; alcohol, 10 minims.

S. C.—Liquid glue is a solution of shell-lac in methylated spirits of wine. A useful cement, free from colour, may be made by dissolving one drachm of gelatine in one ounce of strong vinegar, adding two drachms of alcohol and a pinch of powdered alum. Dissolve, by placing the bottle containing the ingredients in a vessel of hot water, stirring occasionally.

T. RICHARDSON.—Your proof looks as if you had put acid in your sensitising bath, or that the bath was too weak, and the albumen became attacked. Do you make provision for the silver bath becoming exhausted of its silver with every sheet of paper floated upon it?

T.—The arrangement of your room appears to be very judicious. You must avoid cross-lights falling upon the sitter, who must receive direct light on one side, and reflected light on the other, so as to obtain a good chiar-oscuro.

CLEMENCIA.—The best is the cheapest. You should address yourself to one of the many respectable dealers in apparatus, and state concisely what you desire to do in photography; he then will be able to supply you with just what is requisite.

TANTALUS.—If the solution is contained in a very shallow dish, it soon becomes exhausted of its silver; it should be replenished with a strong silver solution, to make up for the silver abstracted by each sheet of paper floated.

K. (Leeds).—Re-crystallisation of the salt will purify it. Dissolve it in a considerable quantity of water: the iodide will then be precipitated; then filter.

G. H.—It will be better for you to practice positive printing before attempting to take pictures with the camera. Your supply of apparatus, &c., need not cost more than twenty shillings.

"FIXING."—Cyanide of potassium is of very uncertain strength. It generally contains a large quantity of carbonate of potash, not exactly as an adulteration, but as the result of the process of manufacture.

TYRO.—To reply to all your queries, would occupy many pages of this journal. Buy one of the many treatises on photography extant, and study it diligently.

ROBT. SEATON.—You have spoiled your bath. Precipitate the silver by strong solution of common salt. Wash and dry the chloride, which you can sell to the refiners.

POSITIVE.—The picture will certainly look very brilliant for a time, but it will surely fade.

I. D. will require a copying camera for the large picture, the construction of which was explained in the "PHOTOGRAPHIC NEWS," No. 82.

W. WALTER.—Methylated alcohol will answer for all the purposes of pure alcohol, except in making collodion.

H. (Hants).—We give the preference to iodide of cadmium, as being less liable to decomposition.

AN ARTIST.—The defect in the portrait arises from too much light upon the sitter. There is no relief, for want of attention to the chiar-oscuro.

WALTER R.—Chloride of ammonium is preferable for salting paper. 18 grains to the ounce of water.

IOTA.—The fogging is caused by light striking the plate, probably in the camera, on withdrawing the shutter of the dark slide.

OSCAR.—It is not a question of toning, but of the capacity of the hypo. for fixing.

NO. 84.—We have not found alcoholic collodion to answer all the purposes claimed for it.

B. B.—Shell-lac is preferable. It dissolves readily in methylated spirits of wine.

A. A.—We think it a case of complete fogging.

OMEGA.—You will not obtain a satisfactory result with plain paper.

MEDWAY.—Methylated spirits will answer for developing solution.

LENO.—It is iodide of cadmium, not calcium.

T. R. (Colne).—See reply to "Oxygen."

O. S.—Your proceeding is illegal.

LENS.—A smaller diaphragm will help to correct the spherical aberration.

PARRY T.—You can buy French collodion at some of the dealers.

HAL.—Your invention is ingenious, but, unluckily, not original.

⁂ All editorial communications should be addressed to Messrs. CASSELL, PETTER, and GALPIN, La Belle Sauvage Yard, London, E.C.

THE PHOTOGRAPHIC NEWS.

Vol. IV., No. 88.—*May* 11, 1860.

INSTANTANEOUS PHOTOGRAPHY.

BY SIR J. F. W. HERSCHEL.

What I have to propose may appear a dream; but it has at least the merit of being a possible, and, perhaps, a realisable one—realisable, that is to say, by an adequate sacrifice of time, trouble, mechanism, and outlay. It is the stereoscopic representation of scenes in action—the vivid and lifelike reproduction and handing down to the latest posterity of any transaction in real life—a battle, a debate, a public solemnity, a pugilistic conflict, a harvest home, a launch—anything, in short, where any matter of interest is enacted within a reasonably short time, which may be seen from a single point of view.

I take for granted nothing more than, 1st, what photography has already realised, or we may be sure it will realise within some very limited lapse of time from the present date —viz., the possibility of taking a photograph, as it were, by a snap-shot—of securing a picture in a tenth of a second of time; and, 2ndly, that a mechanism is possible (no matter how complex and costly—and perhaps it need not be either the one or the other) by which a prepared plate may be presented, focussed, impressed, displaced, numbered, secured in the dark, and replaced by another within two or three-tenths of a second. In fact, the dismounting and replacing need only be performed within this interval; the other items of the process, however numerous, following these up in succession, and collectively spreading over as long a time as may be needful. These postulates being granted, the artist will have nothing to do but to set up a stereoscopic camera or cameras in the point of sight selected, each provided with its appropriate mechanism, arranged so as to be strictly simultaneous in its action for both; to feed them with plates uniformly prepared and sensitised, so long as the action or his supply shall continue; and develop and fix them at leisure.

There is a pretty optical apparatus, called a phenakistiscope, which presents a succession of pictures to the eye, by placing them on a wheel behind a screen, and bringing each in succession to an opening like a picture frame in the screen, of the size of the picture, and so allowing it to be seen; while the eye is in like manner covered by a dark revolving screen, having narrow linear openings in it, which allow glimpses through them precisely *at* (and *only at*) the moments when the pictures are in the act of transiting the frame, and, sensibly, in the middle of its area. By this arrangement it has been found possible to exhibit figures in action—as dancers pirouetting, wheels revolving, &c., by having prepared a set of figures taken from one model presented on various angles to the visual ray. Coarse as the representations so made have been, the apparent reality of the movements has been very striking. The persistence of the impression on the retina and its gradual fading obliterates or glosses over the *hiatus* in a way which, *à priori*, would hardly be thought credible. Now, there is nothing in the law of periodicity, as regards the movement of the model, to influence the result; and we have only to substitute for such a periodically recurrent set of pictures imperfectly drawn by hand, and presented to one eye, perfect stereoscopic and simultaneous pairs of photographs duly presented to both eyes, in their natural order of succession, to produce a stereoscope in action.

Should photography accomplish the problem of representing objects in their natural colours, the illusion would be perfect. In regard to this problem, allow me to make a few remarks. And, first: There is no hope of its realisation if the non-luminous rays (those beyond the visible spectrum, or even those in it, which are what may be called in excess of colour) be not cut off. This may be done by quinine. Secondly: The whole of the colorific rays, from red to violet, must be made effective. Thirdly: We must recollect that we have to work up to a *coloured positive through the intermedium of a negative;* and it is by no means to be taken for granted that this negative—the immediate product of the photographic processes employed—should be coloured either as the objects are, or even with their complementary colours. Should we ever succeed in making the spectrum impress its own colours ever so vividly on paper or on collodion, the colours so impressed will assuredly be of the nature of absorptive media, and it is by no means a matter of necessity that they should transmit either their own apparent hues or their precise complements. In a word, it will be as in porcelain or enamel painting, where the colour *burnt in* has no obvious connection with, or traceable relation to, the colour *laid on.* All experiments towards this end must keep this condition strictly in view, unless, indeed, a positive photography should arise equally perfect with our present negative.

I fully believe that this problem will one day be solved. Already we have a certain approach to it. I possess photographs in which the green of foliage is unmistakably distinguished *as* green from the sepia tint in the other parts of the picture. In particular, a photograph of my former residence, in which certain magnolias, trained against the brick building, and some other shrubs, have a fulness and decision of colour which renders it difficult to imagine that they have not been gone over with the brush, while the use of a magnifier shows that most certainly such has not been the case. In another, a stereoscope of the Assembly Hall, Edinburgh, from Princes Street, the nearer trees present (to my eye, at least) differences of hue, in some of which the green element is very perceptible.

Collingwood, May 7, 1860.

CONDITIONS NECESSARY FOR ENLARGING POSITIVES.

BY M. SILBERMANN.

I have remarked with regret that opticians appear generally very ignorant of many important optical appliances which have been discovered, or contrived, years ago. For instance, the construction of instruments for magnifying images of all kinds, is of very remote date. First came the simple magnifying-glass, and then the microscopes of various kinds followed: first, simple; afterwards with achromatic lenses; then, all those instruments intended to project the image on a plane surface, such as the megascope, the magic lantern, lucernal microscope, solar microscope, &c., of which the camera obscura, the pronopioscope, and the photographic apparatus, are only variations, or reproductions.

In a positive lens there are two points upon its axis—one in front, the other behind, the distances of which from the lens are connected together by a simple formula, by means of which, knowing the principal focal distance, it is easy, for any position whatever of an object on the axis of this lens, to determine at what distance on the other side of it the image will be reproduced. These two distances are complementary to each other, and the two points on the axis where the rays meet are called the *conjugate foci.*

We say, as a fundamental rule, when the object is between the principal focus and the double of this focus, the image will take any enlargement, from the natural size to the infinitely great. So also, if the object is removed double the distance of the focus towards infinity, to become at length, in its turn, infinitely small in relation to the object.

At present we have only to consider actual enlargements. To this end, we must regard our photographic apparatus in a reversed position, or as if the camera was in front of the object instead of behind it; the screen that receives the image remains in its place to fix the object, which is really a photographic proof on a plane surface. The new camera, of large dimensions with respect to the old one, according to the size of the pictures we desire to obtain, will carry at its anterior end the usual arrangements for the focussing screen and sensitive plate.

This general arrangement was realised in the *megascope*, and in the *solar* and *lucernal microscopes*, long before our new art came into existence, and we may appropriate as useful in them:—

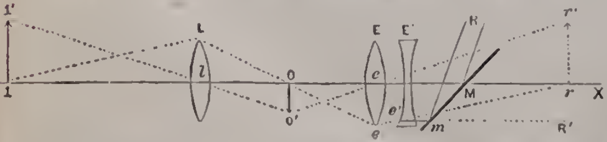
1st. For opaque objects, as proofs on paper, the lighting of the object to be reproduced is effected by plane mirrors, or by concave mirrors, which project a greater quantity of light on the object, to illuminate it better. As the object is opaque, all the rays of light the object reflects back proceed from this object by diffusion, like those which constitute its image. This coincidence between the point of departure of the illuminating rays, added to those of the object, always produces a distinct image, when the lens is well constructed, the focus properly adjusted, and the body quite flat.

2nd. But when the object is transparent, like the picture on a collodion plate, then its too highly-polished surface sends but very little diffused light, and the circumstances of the preceding case no longer exist; then the borrowed light must necessarily pass through the collodioned glass. Here, then, begins the difficulty of arrangement, which can no longer be a simple plane mirror, because the rays it projects on the back of the glass traverse it in a straight line, and focus at the *principal focal distance;* then they cross those of the image whose focus is farther off, and in consequence of the non-coincidence between the two foci, the image is confused, sharpness no longer exists, and the focal effect is destroyed by extraneous light.

The eminent optician, M. Charles, to prevent this effect, and to restore that of diffused light, placed a lenticular illuminator behind the object, first adjusting it so that the additional rays of light formed their focus in the same place as the object to be reproduced. It was afterwards recognised, first by Charles, and then by micrographists, that it was not enough to have a perfectly clear image, but that, besides a perfect centering on the same axis, it was necessary that the rays concentrated upon the object should proceed perfectly in harmony with those of the object, and this harmony is strictly obtained only when the illuminating lens, by its size and position, sends all its rays to the object in such manner that each forms the continuation of that which in part constitutes the image.

The following diagram is the theoretical representation of this effect:—

Upon the line of axis, A X, is the object lens, L, the object, O, having its conjugate focus or image in I. I suppose that the illuminating lens, E, is of the same focus as the object-lens, and that the distance O *c* = O *l;* in this case the illuminating rays must emanate from the point, *r*, of a luminous body, *r r*′, having the same size and extent as the plate in I I′, and be at a distance O*r* = OI, if it be easy to procure such a well-lighted and well-lighting surface.



But, as this is scarcely possible, as we have only the parallel rays of the sun and white clouds at our command, we are obliged to collect together the parallel rays, R, by means of a plane mirror, M, placed upon the axis; but these parallel rays sent by the mirror will receive a modification in their transit before arriving at the illuminating lens, at which they will arrive as if they had set out from the point, *r*, on the principal axis or from the body, *r r′:* to do this we must have a concave lens, E′, the divergent power of which must be exactly that required by the difference of the path *e′ r*. If this condition be realised, we can recognise it, for when we regard the image at I, we then perceive a very sharp representation of the lighting body; at the same time, we see the very clear image of the object lighted. This shows that the two kinds of rays are well crossed in O, and that they proceed in harmony from thence to I; we have not then to fear the effects of interference which generally fringe and multiply the lines.

It is understood that the two lighting lenses E, E′, must be a well-selected achromatic combination. But we see that theoretically we must have a different lighting system for each conjugate focal distance. To obviate this inconvenience in practice, that is, to have less occasion to fear the injurious effects of a given lighting in cases nearly actual, we make the arrangement of the two lighting lenses movable, and convert the first lens of it, E, into an achromatic lens; thus we obtain a tolerable play within and beyond the absolute limits.

NEW COLLODION PROCESS.

BY M. POITEVIN.

This new collodion process presents the advantage of enabling the operator to dispense with the nitrate of silver bath, and admits of his sensitising the plates just before using them, by pouring over their surface a small quantity of a solution of nitrate of silver, of the strength of 4 to 5 per cent. (17½ to 22 grains of nitrate, to the ounce of water). Take an alcoholic collodion, iodised in the usual manner, before pouring it over the glass plate, add to it nitrate of silver in the proportion of 1 part of the latter to 50 parts of collodion; pour on the collodioned plate a solution, strength 2 to 3 per cent., of iodide of potassium, nearly saturated with iodide of silver. Afterwards wash the plate in plenty of water, and leave it to dry. Iodide of silver is formed on the surface of the plate, but, under the influence of the collodion, this iodide remains completely insensible to the action of light, which does not alter it. When it is desired to operate, to sensitise the plate, pour over it some of the ordinary solution of nitrate of silver, and then put it in the camera slide. This is a wet process, it is true, but it offers most of the advantages of a dry process.

NEW BATH OF CHLORIDE OF GOLD.

BY M. L'ABBE LABORDE.

I have tried nearly all the formulæ proposed for toning and fixing positive proofs by chloride of gold. Without attempting to discuss their excellences or objections, I shall content myself with making known a process to which I always give the preference, for I have always found it the simplest and surest:—

Water	12 ounces.
Acetate of soda	4½ drachms.
Chloride of gold	5 grains.

Dissolve; the liquid gradually becomes colourless, and is fit for use at the expiration of 24 hours.

The positive proof, on being taken from the printing-frame, is washed in two or three waters, in order to remove the free nitrate of silver; it is then immersed in the gold bath, where it must be allowed to remain only 25 or 30 seconds, if the bath has not been used before. The action of the bath is stopped by putting the proof into a dish of clean water, where it is washed for a few seconds, and then fixed in a solution of hyposulphite of soda. If the gold bath has been used several times, its action will be slower; we must judge by the tint of the proof when the proper moment to withdraw the proof has arrived. If the gold has not acted upon it long enough, the image will be of a disagreeable red hue, after fixing in the hypo.; if, on the other hand, the immersion in the gold bath has been too long, the image will be of a cold blue hue. There is a variety of tints of sepia and violet between these two extremes, any of which, if preferred to the others, may be readily obtained. In proportion as the gold salt is diminished in the bath, the proof must remain longer in it, until the desired tint appears. The original property of the bath may be restored by the addition of fresh chloride of gold; but, before it is ready for use, we must wait until it becomes nearly colourless; for whenever the gold is not in combination, and acts alone, it weakens the proof, sharing, in this respect, the property of other chlorides, as those of platinum, mercury, copper, &c.

TRANSFERRING COLLODION NEGATIVES TO WAXED PAPER.

BY M. TOULOUSE.

A collodion, rather thick, is requisite, in this process, to obtain a film strong enough to enable it to withstand the manipulation necessary in its removal from the glass. Take the negative, and with a sharp knife cut through the collodion near the edge of the glass, all round, without injuring the image; then carefully moisten with a sponge, or large soft brush, two sheets of ordinary positive paper, rather strong than thin. Take one of these sheets, perfectly moistened, and lay it upon the negative, taking care to avoid bubbles between the paper and the collodion film. When this sheet is spread evenly, it is made to adhere by passing a glass triangle all over it. Then the second sheet of paper is placed upon it, with the same precautions as the first. The whole is left in this state from ten minutes to half an hour, according as the collodion is more or less quickly penetrated with the moisture of the paper. From time to time, an examination is made to see if the film will come off the glass easily; then raising by one corner the two sheets of moist paper, which, when the proper moment has arrived, will completely remove the film of collodion with them. This done, place the two sheets of paper upon a flat board, collodion uppermost, and cover the film with a thin coating of gum arabic of the consistence of syrup, by means of a soft camel's hair brush. Then place on the coating of gum covering the negative, and with the same precautions as were taken with the sheets of moistened paper, a piece of waxed paper of the same size as the negative. Make the waxed paper adhere by pressing it down with the glass triangle, and cover it with one or two sheets of blotting paper. Then turn the waxed paper and the two sheets of moistened paper, which will now be uppermost, and remove then cautiously. The collodion now adheres to the waxed paper, and is left to dry upon the flat board, and the operation is finished. With due care, success is certain. It may easily be perceived what an immense advantage this process offers, in enabling the operator to replace glass plates by sheets of paper. In travelling, especially, the heavy, fragile, and costly array of glass plates may be advantageously superseded by a quire of waxed paper.

MR. HARDWICH ON THE VALUE OF COLLODION AS A PHOTOGRAPHIC AGENT.

The following paper was read at the meeting of the Photographic Society of London on the 1st inst.:—

We are met together this evening for the purpose of discussing the merits of a formula for negative collodion, which a Committee of your Society have reported on. It will be still, perhaps, in your recollection that the original suggestion for the appointment of such a Committee emanated from me, and therefore I think that I am in order in desiring to open this meeting with a few introductory remarks. There are members of our own Society, and also of other Societies, who have expressed themselves as dissatisfied with the course which we have pursued, but I think that it will be easy to justify that course on the ground of necessity. The subject was not only one of great importance, but was much in need of further elucidation. Let me take these points in order.

1. The subject of collodion was one of fundamental importance to photographers. Some doubted this at first, and conjectured that in a very short time a material would be found as superior to collodion as collodion is to paper. Several years, however, have elapsed, and nothing of the kind has been discovered. Further than this, we may affirm that the more complete our knowledge becomes, the greater the difficulties appear of superseding collodion by a vehicle more adapted to fulfil the requirements of the art; for the photo-chemical properties of iodide of silver are so much affected by the exact condition in which its separate particles are precipitated, and likewise by affinities exerted towards it by other bodies, that the list of substances available as supports for that iodide is considerably reduced. Before we can select any film, it must be decided that it has certain facilities for penetration by liquids, and that the movement of the particles of iodide will not be interfered with by reactions other than neutral, such as many bodies, organic and inorganic, are known to possess. The question arises, then, whether collodion is not *the* particular substance which photographers require? if so, we cannot be at too much pains in bringing it to perfection. I have heard it said that in the chemical laboratory we should be constantly at a stand-still without a fluid metal, and that *therefore* we have a fluid metal, viz., mercury. So in photography, since we require a support for the sensitive iodide of silver, we have a substance, which is calculated to answer as a support, and that substance I believe to be collodion. If the members agree with me, they will see that the appointment of a committee to inquire into the best mode of manufacturing collodion was a proper step for the Society to take.

But, 2., the question of collodion is not only important, but difficult, and to a far greater extent than at first appears. This assertion has also been doubted, but nevertheless it admits of the most satisfactory proof. Those only who have manufactured collodion in large quantities, and have continued the manufacture for a long time, are fully aware of the strange anomalies which may arise. Just when they have begun to esteem their process perfect, a new difficulty starts up; and if this be disposed of, it is by-and-by succeeded by another. In the early days of collodion photography, a little manual was published by Mr. Hennah, of Brighton, which rapidly passed through four editions, and was much prized by amateur practitioners of the art. In one of these editions—I think the third—we find the author apparently satisfied with the collodion process as it then stood, and pronouncing it nearly perfect; but in the succeeding editions he is compelled to put in a foot-note qualifying his previous statement, and speaking of the art as, after all, but in a transition state. "The great impediment," he says, "is the absence of a collodion of uniform character. A remarkable and almost unaccountable difference is commonly observed in the degree of sensitiveness to light of different samples of collodion, independently of the iodising solution used; and it is believed that more remains to be done in the preparation of a good collodion than in any other branch of the process, for there is no doubt that most of the superiority of this over other methods is due to the little understood properties of the collodion itself. All who have the time are earnestly recommended to give their attention to the perfecting of collodion, as the most likely means of rendering this beautiful art not only more popular, but also of extending the range of its usefulness far beyond anything it has yet reached."

I have quoted the above remarks as according with my own views, and because their author is known in this Society as a good and candid observer. If it be objected that the book to which I refer was written five years ago, I would say that, as far as any information on collodion in the possession of the Society is concerned, it might have been written six months ago; for although individual makers of collodion have improved its quality, their improvements will not be found in the pages of the Society's Journal; and this consideration brings me to my third and last point, viz., the insufficiency of our published information when this Committee was appointed.

In making the assertion that the Journal of the Society contained no complete information on the manufacture of photographic collodion, I do not mean for one moment to ignore the valuable papers of Mr. Hadow and others, to whom I have on many occasions acknowledged my obligations: I simply wish to observe that there was not in the Journal such a full and minute description of the commercial manufacture of collodion as would enable an intelligent person to prepare a gallon or two gallons of that substance per diem, and to compete, as regards quality, with makers who have acquired a reputation for producing a good article. I may, however, go further than this, and affirm that any individual desiring to become a manufacturer of collodion would, by many communications contained in our Journal, be entirely led astray. It is true that, appended to these communications, we have a distinct announcement that the Society is not responsible for the correctness of the views entertained by the authors; but are we to pass our whole existence in this negative state? and will the public, who look to us to advance the interests of the art, be satisfied by our simply collecting all that comes to hand, and putting it into the Journal, with the above reservation? What they require is something for which the Society *is* responsible; and, therefore, since it is well known that we have amongst us members who understand what a really good collodion ought to be, it was most natural and proper that those members should come forward and make a report. If any one thinks differently, let him state in what manner he would advise the Society to expend its funds, and to attempt the fulfilment of the expectations which have been formed of it. It has been said that to legislate on a question in which different makers have to compete and exhibit their skill is wrong; and so no doubt it would be if these makers worked by one and the same formula; but if it can be shown that a new principle is involved in the formula to be reported on, the aspect of the matter changes. It would be premature to attempt, at this time, to prove that the collodion now before the Society differs fundamentally from other collodions, but at a later period of the discussion this evening I shall be happy to do so. Admitting such to be the case, we are certainly in the right path; and if our efforts to give a definite formula for collodion be crowned with success, the oft-repeated inquiry, What does the Photographic Society do for the advancement of the art? will be replied to for the present.

The Photographic Tourist.

A PHOTOGRAPHIC TRIP UP THE VALE OF NEATH.*

BY J. H. JONES.

After a good night's sleep I arose, and was most agreeably surprised to find it a very beautiful morning. I was not long, therefore, before I was out in search of the picturesque. The first object was the romantic ivy-covered bridge, from which the village derives its name. The best view of it was got by retracing my road of the previous evening for about one hundred yards, and then turning to the right under a rude stone arch, and following the tramway for a short distance. Placing the camera in the proper position, I exposed a plate; and, while doing so, I noticed how much the abutments of the bridge had been built on the solid rock on each side of the river, probably to guard against the recurrence of its being carried away, as it had been eight or ten years previously, by a very heavy flood, which swept away everything before it. After I had finished this picture, I proceeded along the tramway, and, after a walk of a few hundred yards, I turned round, and beheld a scene worthy the pencil of Salvator Rosa. In the foreground, and a little to the right, rose the perpendicular sides of a bold and massive rock, displaying so many different shades and colours, that the eye became lost in trying to pick out some single feature or colour where all was so beautiful. In the centre was the river, whose rocky bed and sides presented that curious glassy appearance which swiftly-running waters so often produce on stone, while in the distance lay the village itself, presenting a striking contrast to the wild but imposing grandeur of the objects nearer at hand. Proceeding upwards, the scenery, although generally wild and graceful, has been injured by numerous levels which perforate the hill side, the black rubbish from which lies about in all directions. The old Flint Mill, which was the object of my coming in this direction, makes a very pretty picture, with the rude wooden bridge leading to it—it being on the opposite side of the river from the one I followed in going there. Returning by the way I came, and passing through the village, I struck into a lane on the left. This lane presents at its very commencement a most rural aspect, forcibly reminding one of the descriptions we often meet with in tales of country life, with barely room enough for a cart to pass, the hawthorn hedge on the right giving occasional glimpses of the river beneath, and on the left the precipitous side of a hill covered with dwarf oaks and other stunted trees. Following this lane for a considerable distance, I came in sight of Craig-y-Dinas, "*the fortress precipice.*" This is an immensely high, abrupt, and rugged crag, nearly perpendicular, and is certainly one of the best scenes in South Wales. Ascending a gentle hillock nearly in front of it, I exposed a plate, and, descending again, I walked round the base of the rock to the Beva Maen, or bow of stone. This rock consists of curious strata of marble; it is an interesting object, and well worth a picture. Hearing the distant sound of falling waters, I followed it, and came in sight of the fall of Tragarth river, which it was necessary to cross several times before I could find myself near enough to obtain a good picture of it without the branches of trees intervening, which is so often the cause of spoiling what would otherwise be a perfect negative. This fall is a little gem; huge masses of stone, which appear to have been torn by a convulsion of Nature from the parent rock, are thrown together in splendid disorder, and the river, rushing between the topmost, falls about eight feet on to another, and thence downwards to a quantity of stones, which, although large, look comparatively small beside the others. I had to expose ten minutes for this picture, for the day had begun to darken considerably, and gave every token of another night of rain. As soon as this was finished I started back, and following the course of the river Tragarth, I came to the Dinas Glen. This is another nice little "*bit;*" the foreground is covered with large stones, between which the river runs. On each side are rocks nearly covered with vegetation, which gradually lessens in width for a few hundred yards and then terminates at the point where the river empties itself into the Perddyn. In the distance, the arches of a wooden bridge, and also a stone bridge a little further on, give a most pleasing effect. This view should be taken as near as possible to the centre of the river, as the glen winds a little. The next object was Pont Stickel, a bridge of one arch, which spans the Perddyn. This view makes a most beautiful picture: the bridge is covered with ivy and other creeping plants, which hang down over the river most luxuriantly; the trees on the right and left add still more to its beauty, while away up under the arch can be seen the river foaming amongst the stones; and in the distance, seen over the bridge, is the grand pass, and the wooden hills on the left of the river. I now packed up, and not wishing to return to the village by the circuitous route over which I came, I followed the bed of the river, and crossed at a place where I thought it was fordable, and had nearly got over, when my foot slipped and in I went, thus getting a ducking for the pains I took to save myself trouble. By the time I reached the inn it was nearly dark, and, after having dined, I sent for the guide who was to accompany me the next day. After making the arrangements I proceeded to develop a few of the plates to see how the exposure tallied. With the exception of one, I was quite satisfied that the exposure had been correct; I had, in several instances, exposed for a much longer time than I had been in the habit of doing, and I found that the plates, the exposure of which, in some cases, was doubled, would have borne a little more without being in the least solarised. After I had completed this job, I went to the public room, where the innkeeper's son was playing on the Welsh harp, and several couples were dancing; the merriest of the lot apparently was the guide, a man between forty and fifty, who had spent a great deal of his life at sea, and, after "many a roving year," returned to his native hills, and now occupies himself by quarrying, when not engaged as a guide. His name is William Jones; he has many a pleasant story to tell of his travels, and the fairy legends of his country; indeed, he can, as I afterwards proved, beguile the tedious hours and weary walks in a manner which (except the broken English) would not discredit a man who had been much better taught.

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* Continued from vol. iv. p. 4.

It had by this time begun to rain, but I did not feel so doubtful as to the result after the experience of the night before. Shortly after I had finished breakfast the following morning, the guide made his appearance, and off we started, passing through the lane I have before mentioned. I soon found myself at the foot of the grand pass, the ascent of which is no very easy task. After gaining the top of the crag, and crossing to the right, over a low stone fence, I looked down upon the dingle, through which Tragarth river flows in its passage to the Perddyn, and immediately opposite is the fall I have mentioned before; but, seen from this elevated position, it does not look near so large as it did from the dingle below. My route now lay over a wild common, stony, and it would be dreary, did not the dells on each side enliven the scene. At the upper end of the common, just before I came to a ruined farm-house, the guide desired me to look to the left. I did so, and beheld before me the whole valley, stretching far away in the distance. The day was so bright and clear, that Swansea and even the Lighthouse at the Mumbles could be seen distinctly with the naked eye, while immediately in the foreground ran the Perddyn, bounded on the right by a line of high grounds parallel to its course, its banks wildly overgrown, and darkened by the projecting shadows of the impending cliffs; the acclivity on the left is completely clothed with magnificent timber, contrasted with the rougher growth and sometimes naked pinnacles of the opposing ridge, whilst here and there may be seen the mills and stores of the Vale of Neath Powder Company. I stopped to expose a plate on this view, and afterwards proceeded onwards. Just beyond the farm-house is the point where the Hepste and Melte join; the bed of the former is at an immense depth immediately below, and the two rivers are separated by a rich, turfy, well-wooded promontory, forming a frontispiece to the view when you look up the course of the rivers. The roaring of the Hepste is heard at a considerable distance, as approached from the higher grounds. Arrived at the edge of the dingle, the great fall bursts at once upon the view; a broad sheet of water projecting itself over an abrupt ledge of rock, to the depth of fifty feet. The distance of the fall from the junction of the two dingles with their rivers is much less than a quarter of a mile, so that both these objects can be embraced at once from the higher ground. But the general view of scenes like these is never the most interesting, the less obtrusive but most beautiful features are lost, while the termination detracts from the sublimity. By taking the parts in detail, on the contrary, the attention, undisturbed, is alive to every concomitant circumstance, as well as to the leading character of the object; nothing is overlooked, because nothing is too distant or too perplexed to be taken in, not only by the mind and eye, but also by the camera; every turn presents something new, while the perspective, lessened into obscurity as it lengthens, holds out the promise of still unexhausted variety. But not wishing to lose any particular object which would serve at a future day to recall the pleasure I felt in this trip, I took a view of it, and then began the descent, by which to examine the fall more minutely: this is down a rugged and steep rock, which forms the boldest feature in the dingle at the bottom, but affords a very abrupt and hazardous passage. The ground was so slippery, owing to the lately fallen rain, that I was obliged to hold on to the branches of trees to prevent my falling. The ascent on returning, if it was necessary, would be very difficult, and when I arrived at the bottom there appeared no other way, for the violence with which so large a body of water is precipitated has worn the rock of the bed below the cascade into a large and deep pool, and the breadth of the water all through the dingle, especially when augmented by heavy rains in the night, as on the present occasion, besides other obstacles not yet appearing, prevents its being forded. It excited in me, therefore, a strong sensation of surprise, not unmingled with pleasure, when the guide told me that the road lies, very unexpectedly, behind or under the fall; for such is the rapidity of the torrent, unprepared by previous obstacles for the perpendicular of the precipice, that the interwoven sheet is thrown out so far as to leave a clear passage, at all times, wide enough for a horse to pass between the falling river and the rock. The path is formed by a rude, natural ledge of limestone, covered with moss, at about one-third of the height from the bottom of the precipice. Its breadth is about three feet, and constitutes the only projection in what would otherwise be like a flat wall. The stone, however, shelves a little inwards from the topmost edge, while the water is forced forwards; so that the two elements unite in forming, as it were, a roof or canopy over the head of the pedestrian or the equestrian. But, surely, some of your readers may say, "Horses are not taken across in this way." Yes, they are; and not only taken across, but are often ridden over by the man or boy who accompanies each horse hired by visitors. It was done while I was there, and I very much doubt if any other than our mountain ponies would be sure-footed enough to do it; for the path is so slippery, that it is very dangerous, even to a foot passenger.

(*To be continued.*)

Dictionary of Photography.

Nitrate of Uranium.—There are two nitrates of uranium—the proto-nitrate and the per-nitrate: the latter is a nitrate of the sesquioxide of uranium, and is the one employed in photography. It crystallises in the form of yellow prisms, which deliquesce in the atmosphere, and are very soluble in water, alcohol, and ether. It is employed in positive printing. Paper impregnated with nitrate of uranium yields proofs which are developed by a solution of nitrate of silver and chloride of gold.

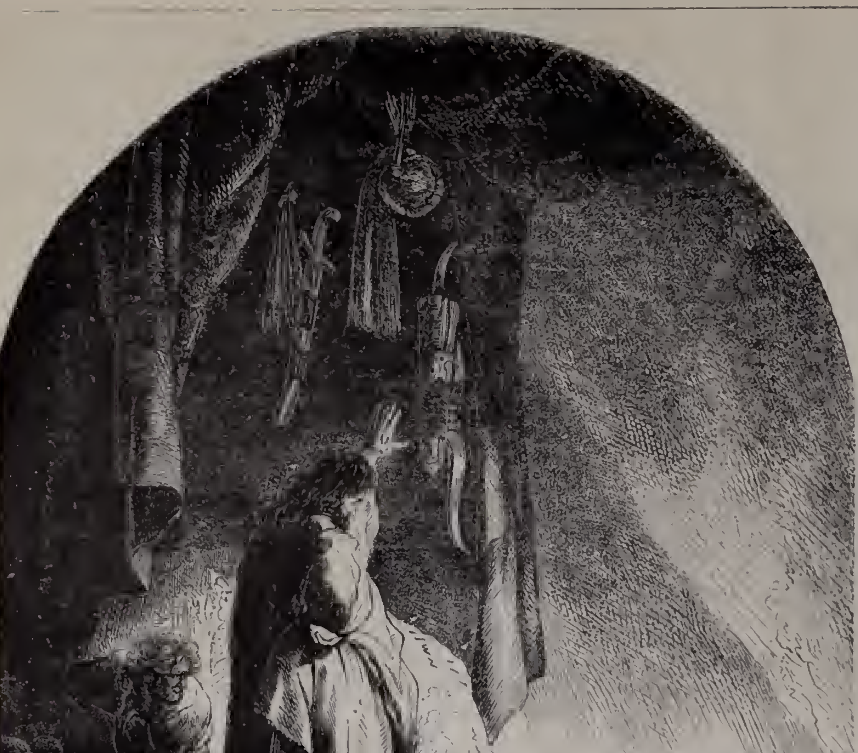
Nitrate of Zinc.—A combination of nitric acid and oxide of zinc. It is a deliquescent salt, which has been successfully employed for preserving negative collodion plates, in the same manner as nitrate of magnesia. Nitrate of zinc enters into the composition of certain developing formulæ, as a partial substitute for acetic acid; but its influence is very questionable.

Nitrites.—Salts resulting from the combination of nitrous acid with the several bases. The only nitrite of interest to the photographer is the nitrite of silver.

Nitrite of Silver.—A compound of nitrous acid with oxide of silver, containing two atoms less of oxygen than the nitrate. It crystallises in long, slender needles, soluble in 120 parts of water at 60°. When nitrate of silver is fused, if the heat be too strong, it is partially decomposed; oxygen is disengaged, and *nitrite* of silver is formed. If the heat be continued, both nitrogen and oxygen are disengaged, till, finally, only metallic silver remains in the crucible. The formula of nitrite of silver is AgO,NO^3.

Nitrate of silver, containing *nitrite*, if present in the sensitising bath, produces *fogging*.

(*To be continued.*)



ON COMPOSITION AND CHIAR-OSCURO.—XIII.

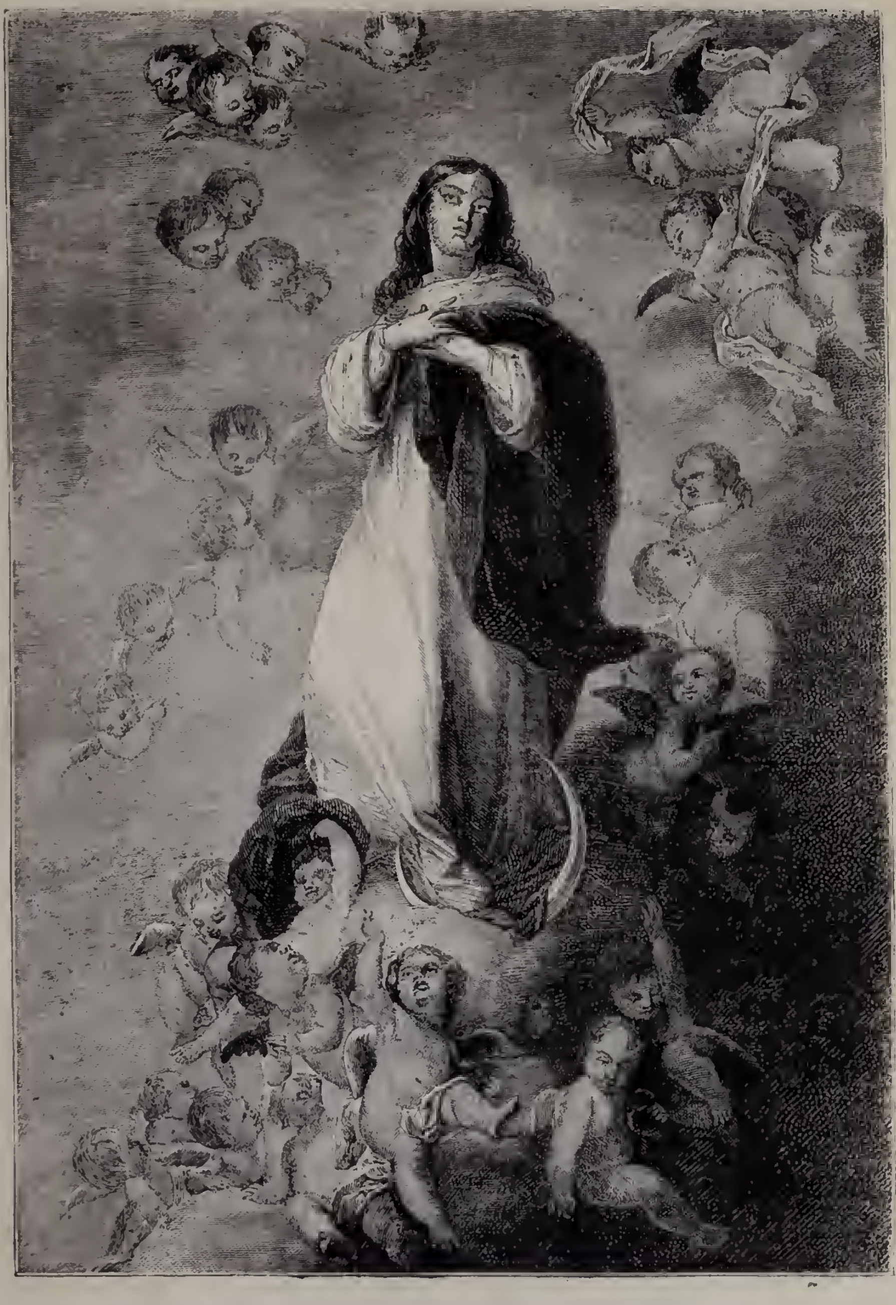
BY MR. LAKE PRICE.

"The highest finishing is labour in vain, unless, at the same time, there be preserved a breadth of light and shadow."—Sir Joshua Reynolds.

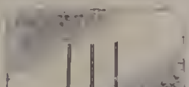
Breadth of effect is most essential in pictorial representations. We have seen that, in linear composition, it is attained by unity and simplicity of direction of the lines of the picture. In the chiar-oscuro the preservation of breadth of effect is of equal or even greater importance; it is secured by attention to the following principles:—

First, by a light and shade which is free from all spottiness and entanglement of its principal and secondary lights, and from a bewildering confusion of unconnected shadows. In all fine works the chiar-oscuro is of a broad and simple nature, although, from the varied nature of the subjects, and the individuality of the artist's treatment, it may be arrived at in different ways. In the interior, by Ostade, page 7, the quality is attained by the skilful interweaving and connecting of the whole of the *principal* lights, which are led into one another, and which are repeated and disseminated into the depths or *secondary* lights, thus gradually assimilating them to the darks, so that an extended and complete scale of harmonious gradations appears in the picture. In the works of Rembrandt we always find everything give place to breadth of effect; the eye is not allowed to be arrested by the shading or elaboration of any object which would interfere with the flow of the principal light, which passes over and connects all the objects included within its influence in one broad undisturbed mass. The results of this treatment are to impart a luminous quality to the unbroken light, and, by the extreme simplicity of the chiar-oscuro, to facilitate the *instant* appreciation of the subject by the spectator.

This quality is equally found in all Rembrandt's works, whether the subject be comprised in one or two persons, or (as in the "Hundred Guilder" etching) of a multitude of figures. None of his pictures will better illustrate the foregoing remarks than "The Raising of Lazarus." We perceive in this subject the light strongly opposed on the left by the dark drapery of Christ, which gives relief to the figure, and takes the eye within and beyond it, thus giving power and rotundity, from which focus of *principal opposition* it passes over to the right, waning gradually off till it is lost in the gradations of half tones or passes *out of the picture*, every form it meets in its passage being absorbed in it and kept light for the purpose of maintaining its unbroken mass. Very similar in principle to that of Rembrandt is the chiar-oscuro of Corregio; a main light, in which all forms are tenderly and lightly touched, and with whose breadth nothing is permitted to interfere, whilst the principal lights are always connected and repeated by successive gradations of half tones till lost in the darks. In the works of Murillo we see a consummate knowledge of the true principles of light and shade; whether in his large religious pieces, or a mere group of beggar children, his art is always scientific and instructive. In his picture of "The Immaculate Conception," now the principal gem of a galaxy of *chefs-d'œuvre* in the Tribune of the Louvre, we see a most refined and elevated treatment of chiar-oscuro. In the central point of interest—the Virgin—we have the principal opposition of light and dark, which, however, occupy, relatively to the entire surface, but a moderate portion of the canvas; the remainder being entirely half tones of *every gradation*, from the delicate *nuances* of light shadows on the *white* drapery (whose finesse it is impossible to render in a wood-cut) down to the half-seen forms of the angels, which melt into the strong shadow which serves as a firm base of support to the composition, and gives, by contrast, an ethereal radiance to the upper portion of the subject. This picture is a fine exemplification of the art term, "breadth of effect;" the whole power and range of light and dark, and their intermediates, is used in the most masterly manner, the strong and brilliant opposition of their white and black being contrasted on a *small portion* only of the picture, and both being the concentration, or focus, of a series of broken tones leading gradually away from them. A convincing test of its *great breadth* is seen on merely quickly opening and shutting the eyes, which it is not possible to do so rapidly but that the subject, in its integrity, shall have impressed itself on the mind of the spectator; which does not occur if a confused and heterogeneous chiar-oscuro is tested in the same manner.



The light is generally better carried across a composition on the diagonal, *a*, which has several advantages. First, its flow antagonises better the *square* of the outside form of the picture; next, as the majority of forms in nature are vertical or horizontal, it *contrasts* advantageously with them; and, lastly, there is, *per se*, more mobility and play in this direction—which is, as it were, out of balance and on the move—than in the rigidity of the upright. An example of this principle is seen in the Murillo.



a

In subjects containing large masses of deep shadow, as interiors, portraits, &c., we find, in all good art, the principle of introducing, where practicable, small bright lights on objects coming immediately off the background depths. The value of this principle seems early to have been appreciated. We find it in Hemling and Van Eyck, in Giorgione, Titian, and Rubens, in Rembrandt, Dow, Metzu, and all the Dutch masters. The lights on armour, mirrors, glass vessels, &c., are the general means used for obtaining the effect. The advantages gained are, an increase of depth and power (by opposition) in the darks, and, at the same time, atmosphere and distance, by the contrast of the sharp, clear flash of light against the smooth, flat shadows. In portraiture, or figure composition, the principle is of infinite value, since the soft, rounded forms of flesh gain immensely in "*morbidezza*," by their contrast with the metallic hardness of this species of light. The flash on the mirror, in the well-known picture of "Titian and his Mistress," is one of a multitude of examples which could be cited, illustrative of the principle. The value of the effect of this sharp light on the soft flesh-tints of the neck and bust of the female is well tested, by covering (in a copy) and uncovering it pretty rapidly.

In art it often happens that, in too great a desire to obtain breadth of effect, a monotonous insipidity has resulted from the softening down of *all* vigorous opposition into mere half-tones, which likewise have been blended and melted into one another. In the pictures of Vanderwerf this treatment is especially observable. The result is most unsatisfactory; instead of the relief, brightness, and atmosphere which is seen in a chiar-oscuro composed of *all* the gradations of tint, the suppression of pure black and white deprives the picture of vigour; whilst the half-tones, missing the contrast of the dark and light, remain muddy, and do not keep their relative distance in the work; the effect of small portions of distinct contrast of white and dark being to "clear out" the half-tones, and, by its superior vigour, to give them distance and atmosphere. In photography, the dread of "black and white" pictures has been carried to an excess, and the result has been that really fine light and shade is seldom seen, mere detail being considered the great desideratum. In portraiture, nothing can be finer in their chiar-oscuro than the works of Sir Joshua Reynolds; and a careful study of the excellencies seen in them would convince the photographer that he is still far from producing the quality of light and shade which they possess. As has been elsewhere mentioned, the light and shade are treated in fine broad *masses*, and mere detail is, in these works, made of secondary consideration. In the generality of photographs, a Denner-like minuteness and flat insipidity is the main characteristic; it seems to be considered that *too much* detail cannot be given, which is artistically incorrect. The attentive study and appreciation of the chiar-oscuro of the great masters in the art would, doubtless, make its ameliorating influence distinctly felt.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 8th May, 1860.

M. Czugafewiecz has invented lately a new photographic instrument, which he calls a "Russian Stereoscope." I will endeavour to give you an idea of it:—In the position usually occupied by the proofs in a stereoscope of ordinary form, the gentleman above named disposes two bands of paper of any length, rolled upon two axes which are parallel to the ocular glasses of the instrument. Each of these photographic ribbons has received the same image in an apparatus such as the one invented by M. Porro, specially constructed for taking panoramic views. This image is either composed of one wide panoramic proof, or of a certain number of ordinary proofs juxtaposed. By turning a small handle attached to the apparatus, the two bands are unrolled from one axis, and transported upon the other simultaneously, in such a manner that the corresponding portions of each proof are seen by the spectator at the same instant, and the latter thus enjoys a *stereoscopic view of a vast moving panorama.*

The author above named has a second apparatus in consideration; an instrument for taking panoramic views by means of a rolling band of paper, and an objective properly disposed. But the readers of the "Photographic News" are already aware that such an apparatus was, after much study, constructed in Paris by M. Porro, at the time of the Italian war; it was ordered by the Sardinian Government, and answers its purpose admirably.

The Abbé Laborde, who, had he lived in the time of Galileo, would have been tortured and burnt long ago, still labours peaceably for the benefit of photographers. He has just concocted a new *chloride of gold bath*, which would, doubtless, have been acceptable enough, before the valuable remarks lately published by M. Fordos, to which I called your attention lately. At all events, there is no harm in trying, even now, M. Laborde's new bath, if, indeed, it presents, as he asserts, "the greatest simplicity and the greatest certainty." The author dissolves 30 grammes of acetate of soda in a litre of water, and then adds 1 gramme of chloride of gold. The liquid slowly becomes colourless, and may be employed 24 hours after the mixture has been effected.

The positive proofs to be submitted to this bath are washed in two or three waters, to remove all the free nitrate of silver; they are then plunged into the gold bath, where they remain from 25 to 30 seconds, when the bath is new. The action of the latter is arrested by plunging the proof into water, and moving it rapidly in this liquid. The proof is afterwards fixed with hyposulphite of soda. When the gold bath is old, a longer immersion is necessary. Its primitive qualities may be restored by adding a little chloride of gold, and waiting until the mixture has become colourless. If the action of this new bath has not been continued long enough, the proof, after fixing, has a disagreeable red tint; in the contrary case, the image presents a uniform cold blue tint. We are recommended to operate between these extremes, in order to obtain the violet tints, which are, according to the author, generally preferred.

In my letter of the 23rd of April last I announced to you that M. Liais was about to bring forward proofs that the newly-discovered planet close to the sun, and which has been called "Vulcan," was nothing more than, as the French say, a *canard* dished up by M. Lescarbault and M. Leverrier. The memoir of M. Liais has appeared, as was announced in the *Astronomische Nachrichten.* The author happened, by pure accident, to have been closely scrutinising the sun's disc at the very moment the planet was said to have been discovered; but no trace of such a body did M. Liais observe. He says, "The observation of Dr. Lescarbault was partially manufactured second-hand, and therefore we have no reason to believe that it was not so entirely (!) . . . If M. Lescarbault had really had an observation of such importance in his portfolio so long a time, he would have published it long ago. May we not reasonably suppose that, seeing the attention given to M. Leverrier's remarks on the motion of Mercury, he would be certain to find a 'backer,' and become celebrated immediately (!)?" M. Liais having proved that no planetary disc was perceptible upon the sun's disc at the time indicated by M. Lescarbault, goes on to refute M. Leverrier's theory, that the presence of such a planet is necessary to explain the motion of Mercury's perihelia, which, according to M. Liais, is owing to errors of one or two seconds in the measurement of the obliquity of the ecliptic; which, in their turn, may be attributed to uncertainty in the estimations of refractions.

Here, then, we have the so-called planet Vulcan placed, not between the sun and Mercury, but between the fires kindled by the contesting spirits of ardent astronomers!

The *Cosmos* has been bold enough to say to M. Liais something to this effect: "If you don't believe in M. Lescarbault's planet, do you think we shall believe in your new comet?" (!)

A long memoir upon the brain of the large ape, *Gorilla gina*, that would be exceedingly interesting to Professor Owen, has been published in the last number of the *Comptes Rendus*, by M. Gratiolet. In this paper the author proves that, in spite of the size of the gorilla, the brain of this animal is very inferior in organisation to that of the chimpanzee, so remarkable for its instinctive faculties.

A new gas—quadricarbide of hydrogen (C_4H_2) — was discovered lately by M. Berthelot, as a product of the decomposition of alcohol or ether by a high temperature. This gas is a very remarkable one. Its properties have just been made known for the first time. M. Berthelot calls it *Acetylen*, and it is destined to become the basis of a long series of compounds, like those derived from the other carbides of hydrogen. To extract it, it is made to combine with copper, by passing the mixture of gases resulting from the decomposition of ether, alcohol, &c., by heat or electricity, through an ammoniacal solution of protochloride of copper. A red detonating compound is obtained, which, on being dissolved in hydrochloric acid, evolves the new hydro-carbon, acetylen.

This red detonating compound has been examined already by Quet and Boettger. The latter *savant* obtained it by passing a current of common coal gas through a solution of protochloride of copper. He was much struck by its detonating properties, but neither he nor M. Quet imagined it contained so interesting a body as acetylen.

The latter is a colourless gas, soluble in water, of a disagreeable odour, burning with a bright, smoky flame. When mixed with chlorine gas, it detonates almost immediately, and deposits carbon; this phenomenon takes place even in diffused daylight.

DRY COLLODION PLATES.

To the Editor of the "Photographic News."

Sir,—Perhaps the following may be interesting to some of your readers, as showing the length of time dry plates may be kept without much loss of sensibility.

On *the 3rd of June, last year,* I prepared a number of plates, by Mr. W. W. Hughes' linseed process. (See "Photographic News," vol. ii. p. 130.) I used most of them at the time, but six remaining over, I put them aside, and quite forgot them till last week, when I tried them in the camera.

To the first I gave *one minute's* exposure, increasing the time for each by 15″, till the last was 2′ 15″.

I then placed them in a dish of rain water for about 30″, and developed with gallic acid mixed with pyro. and a few drops of a 20-grain solution of nitrate of silver.

As I did not expect much to result from any experiment, you may well believe how pleased I was to find the picture come out rapidly and fully—quite as much so as if the plates had been prepared only the day before; and further, that those of 1¼ and 1¼ and 1½ minutes' exposure were the best, the others being evidently over-exposed.

I certainly had a very fine day, and my subject was a large white building. I used a full-sized lens, double achromatic or portrait combination, stopped down to make the edges clear.

The plates had been kept carelessly in a *deal* box, and this not being perfectly light tight, every plate had a black bar right across it, where the light had passed through the crevice; but as I only write this to show the length of time plates will preserve their sensibility, this bar, though to be regretted, does not affect my conclusion.

I find the difficulties and *accidents* of the Taupenôt process almost insurmountable. Fothergill's is far easier and more certain, but, in my opinion, the linseed process excels all in facility and certainty, and the above details prove how long plates may retain their sensibility.

I congratulate you on having completed the third volume of your very useful periodical, and wish you a continued career of equal success.—Yours, very truly, M. Esmond White.

P.S. Of course these six plates were negatives, and here I may observe that negatives by the linseed process are much more *non-actinic*, or print far better, than they might be supposed, they having a large amount of yellow colour in them, but you can darken them as deep as you please by the pyrogallic acid and nitrate of silver, with, however, a considerable risk of spoiling them by so doing.

Carlow, April 29, 1860.

PHOTOGRAPHIC MAGIC LANTERN.

To the Editor of the "Photographic News."

Sir,—In No. 84, "Apocryphal" makes inquiry concerning the convertibility of a photographic camera into a magic lantern; and in No. 87 "T. R., of Colne," gives his experience in relation thereto, from which we gather that he failed to convert the camera, and that he constructed a lantern to fulfil his purposes. He has not entered into the question of the possibility, or otherwise, of adapting the camera to serve as a lantern—I therefore take leave to offer a few remarks on this point. The camera is for a purpose so totally distinct from that of the magic lantern, that the one instrument cannot be made an effective substitute for the other. The camera takes up pencils of light from every point in a large picture, and paints them in miniature upon a small surface; the lantern, on the other hand, expands a small picture, and, by strong illumination carries it to a screen, under conditions favourable to the enlargement. In the camera, a large surface of ordinary daylight produces, by its concentration, a brilliant miniature picture; whilst, in the lantern, an extraordinary illumination immediately behind the miniature, gives, after wide divergence, a good ordinary light of large surface upon a screen. Now, there is no way by which you can preserve the integrity of your camera, and, at the same time, include in it the appurtenances of a lantern. You require an intense light, with a powerful reflector at the back, and a condenser in front, to illuminate the picture, which must be placed (to avoid loss of light) within an inch from the condenser. Suppose mechanical arrangements to be made by which the light and its accessories, and the picture, could be placed in requisite relation to each other within the camera, and what would be the result? The heat generated by the light would destroy the camera, and render it totally unfit for its primary use. This is the most obvious objection. But look for a moment at the required lantern adaptations, and observe how they must interfere with the arrangements for photographic purposes, such as the focussing glass and the dark slide. It is a very false economy to adapt instruments to various and widely differing uses. The old opticians tried to unite the telescope and microscope under one construction, and they signally failed. Let the photographer confine his camera to its legitimate duties; and if he wishes to show its pictorial results to a large company at once, let him procure a good lantern, with a three-and-a-half inch condenser, and all necessary appointments, for from £4 to £5, and thus equipped, he will, with suitable photographs, be able to make a brilliant exhibition. Delicate manipulation is necessary in the preparation of photographs to be used as magic-lantern slides; they ought not to be heavy and opaque. Some subjects, such as florid gothic buildings, are especially adapted for lantern slides; the details of the architecture break up the masses of colour, and produce an agreeable balance of light and shade. Other subjects require to be opened up with an etching needle, and toned with colour, to render them pleasing and effective. Any reasonable amount of labour is well bestowed in bringing a photograph into the best condition for exhibition on the screen. The precision of outline produces an almost stereoscopic effect, which may, however, result, in part, from the picture being insulated in surrounding darkness. Good and brilliant effects, ten feet in diameter, are obtainable with an argand gas-burner of forty-eight holes.—I am, yours obediently, Thomas Rose.

Glasgow, May 8, 1860.

THE PNEUMATIC PLATEHOLDER.—INFRINGEMENT OF PATENT.

At the sittings in Banco, on Thursday, the 3rd inst., an action, Walton *v.* Lavater, was tried before Mr. Justice Byles, for the infringement of a patent. On the grounds of misdirection, and that the verdict was against evidence, a rule had been obtained for a new trial, and on the previous day Mr. Hindmarch showed cause against the rule. Mr. Webster was now heard in support of it.

The defendant, it appeared, was the inventor of a pneumatic plateholder, used by photographers. By the application of a round patch of india-rubber as a sucker, and a screw fastened to the centre through a holder, the centre was withdrawn, and, creating a vacuum, a plate of glass was firmly held. The defendant assigned one moiety of his patent to the plaintiff. He subsequently sold the other moiety to one Dodge, who assigned that moiety also to the plaintiff. The defendant manufactured in France a novel application of the same principle which he called "pneumatic brackets," or a holder and sucker to attach to a wall or any smooth substance, the holder having sockets attached in which candlestick branches could be placed, or it could be used as a hatpeg. These the defendant imported and sold in this country, and for this alleged infringement of the plaintiff's patent the present action was brought.

The Chief Justice, in giving judgment, said he was of opinion that the rule ought to be discharged. The first ground on which the rule had been moved for was that the patent was not vested in the plaintiff, and that he was not entitled to maintain an action. The patent had been assigned as to a moiety to the plaintiff by the defendant; and as to the other moiety, the defendant had assigned it to Dodge, who had assigned it to the plaintiff, and both moieties were vested in the plaintiff at the time that this action accrued. It was contended by Mr. Webster that the grant of a patent was an indivisible franchise, and that the assignee took only a license, and had a right to an account of profits, but that the whole of the original franchise remained in the original patentee, and that even although, as in the present case, the whole patent was assigned to him, he was yet an imperfect owner, having an equitable right to the profits only. He (the Chief Justice) could not think that it could be established that the legal owner had not the whole legal right. He considered that the 15th and 16th of Victoria, cap. 83, sect. 35, incidentally recognised the passing of an interest in a patent, and provided that assignments of it should be registered; and, although it by no means directly enacted this, yet this effect was contemplated by the Legislature. The 26th section also said that a patent might be assigned to a larger number than 12 persons, which was the former law. Mr. Webster contended that assignees were all to take, as joint tenants, which imported survivorship, while commercially they would take separate interests. Such a state of the law would be very inconvenient, and it seemed to him that that argument failed. The defendant had assigned both the moieties, and he thought the cause of action vested in the plaintiff, if there was an infringement of the patent. It was next contended that there had been no infringement by the defendant, because he had only sold the articles which were imported from abroad. He had heard the arguments of the counsel on both sides as to the expressions in the original grant relating to patents, giving the exclusive privilege to the patentee to "make, use, exercise, and vend," the defendant's counsel contending that the defendant had not come within these words, the word "vend" being only in the reciting part of the grant; but it appeared to him (the Chief Justice) to have been clearly the intention of the grant or privilege to prohibit the use of the patented article by selling, which was the main profit of a patentee. It seemed to him that selling a patented article for profit would be good evidence that the seller had "used" the patent. And with respect to the defendant not being liable for selling the articles patented because they were imported from abroad, he should say, if that were simply the case, it was sufficient to charge the party with infringing if he had imported and sold. But it was not necessary to lay that down in the present case, because the defendant had a full knowledge of the patent, and the article sold was not made by another manufacturer and imported, but was manufactured by himself in France, and stamped with his own name. That was good evidence that he caused the article to be made in France, and knowingly imported it in violation of his patent, which he had sold to the plaintiff. It was then contended that the patent did not extend to the article sold, which was called a plate-holder in the patent, and by Mr. Webster a peg. Between the plaintiff and the defendant he (the Chief Justice) was of opinion that the defendant could not raise the question that the patent was void for want of novelty, the pneumatic principle having been before known and applied. Looking at the specification and disclaimer according to Mr. Webster, the patent was intended to give up Bolton's plate-holder, and to be confined to pneumatic instruments, pegs with accessories, rings, hooks, &c., and was a patent for applying accessories to a pneumatic instrument. He (the Lord Chief Justice) was of opinion that it was not a patent for adding these accessories to such an instrument, but was a patent to cause pegs to adhere to solid surfaces by the application of the pneumatic principle. The rule must therefore be discharged.

The other learned Judges concurred.—Rule discharged.

Proceedings of Societies.

City of Glasgow and West of Scotland Photographic Society.

The third ordinary meeting of the City of Glasgow and West of Scotland Photographic Society was held on Thursday evening, the 3rd inst.; J. **Kibble**, Esq., President, in the chair.

The minutes of the last meeting having been read, and five new members balloted for, the President delivered the following address

ON THE INFLUENCE OF LIGHT AND HEAT IN CHANGING THE PHYSICAL PROPERTIES OF BODIES.

It might almost be considered, from the voluminous papers written upon the influence of light in darkening the various salts of silver when in contact with organic matter, that the subject, by this time, must be nearly exhausted; but, as a proof against any such supposition, we have only to remember that an ordinary lifetime is insufficient to mix a very few grains of any two substances in their various proportions; so that what is yet to do in submitting the 62 elements already recognised by chemists—which comprise the earth we inhabit, in all their different proportions, to the action of each other, and that under different degrees of temperature, of pressure, under the influence of electricity, and of the two former combined in vacuo, and numberless other arrangements—will require a period of time as difficult for the mind to conceive as the comprehension of eternity itself. This remark I make chiefly to remove the idea possessed by many, that their time is too limited or their means too inadequate to enable them to enter into the field of investigation. Also, many consider their chemical knowledge too feeble to enable them to add any information to that already amassed. But I trust a very simple question will dissipate any such false impression—and that is, Whence our knowledge of the darkening influence of light on the chloride of silver? Was it originally the result of investigation? Certainly not. It was the effect of a cause made palpable to the eyesight when wholly undreamed of, and which could no more be hindered from imprinting the fact on the retinæ than the sounds which I now utter from being the means of communication between us. The whole merit, after having seen the effect, consisted in analysing the mode of action of the cause, which merit, without doubt, belongs to the illustrious Scheele. Yet, notwithstanding the laborious researches of subsequent philosophers, on account of the mysterious nature of the subject there still remains much to be learned. All must admit who have practised photography, that wonderful changes have resulted from apparently trifling causes, which, although not satisfactorily explainable, are nevertheless of great value. One great source of change is heat. The annoyance given by a very few degrees above the average summer temperature must be too familiar to all of you to require any enumeration at the present time; but, perhaps, although not directly connected with photography, I may be allowed to bring under your notice a few instances of the important part caloric plays in chemistry, and which, in all probability, exercises similar actions in many of our own processes, as yet unsuspected, which will at the same time show the necessity of precision in noting all experiments carefully, so that when a result of any consequence is attained, the same can be accurately repeated. The first substance I shall mention is one familiar to all of you—that fluid by which the yolk of egg is surrounded, albumen, in its ordinary state. It is semi-transparent, nearly colourless, soluble in water in all proportions. Increase its temperature to 165 degrees, and mark the change. The mobility of its particles, until acted on by some other force, is destroyed, its transparency gone, it no longer dissolves in water; it now presents a beautiful white porcelain aspect, which will dissolve with the aid of heat in hydrochloric acid, producing an exquisite purple solution, although *both* substances *previous* to solution were colourless. Gelatine, on the other hand, which is almost insoluble in cold water, by the addition of a very few degrees of caloric, loses the cohesion of its particles and enters into solution. Again, the carbonate of lime, when crystallising from cold solutions, arranges its particles in the form of Iceland spar; when from hot solutions, in the form of arragonite. Both these minerals, although composed of exactly the same amount of carbonic acid and lime, are physically quite different. Still more striking, and also upon the authority of Liebig, cyanuric acid, which is crystalline, soluble in water, capable of forming salts with metallic oxides, when heated in a hermetically-sealed vessel, and a high degree of temperature applied, becomes a volatile and highly corrosive fluid, which cannot come into contact with water without *instant* decomposition, and which, if kept at the common temperature for some time, is converted into a white substance resembling porcelain, absolutely insoluble in water, *no* constituent being separated, nor any body taken up from without. Thus we see the same constituents, in *exactly* the same proportions, when made subject to a different molecular arrangement by heat, form compounds with totally different properties. Phosphorus also undergoes similar transformations. In its ordinary state it is almost colourless, dissolves in bisulphide of carbon in all proportions. In small quantities it is exceedingly poisonous; when exposed to moist atmospheric influences it *oxidizes*, forming a deliquescent acid. If heated in a vessel from which air is excluded, and kept at a temperature ranging from 464 to 482 degrees, its former properties are destroyed, it becomes of a brownish red. A quantity that formerly would produce certain death is now inert on the animal system; it does not change in moist air, and is now insoluble in bisulphide of carbon. A low red heat once more restores its original properties. Another very singular instance may be adduced, in the conversion of alcohol, by the influence of heat and sulphuric acid, into that most invaluable of all bodies to the photographer, ether. If the alcohol be above 90 per cent. the amount of sulphuric ether obtained is proportional to the amount of the former used. The sulphuric acid, on the other hand, until weakened by the water left by the alcohol, retains its powers of conversion unimpaired. Witness the action of heat on metallic zinc; up to 210 degrees it is brittle; from 210 to 300 degrees the particles admit of considerable freedom of motion on one another, and can be rolled into sheets without at all impairing the cohesion. Raise the temperature a very little, its ductility is destroyed—the metal now separates with the blow of a hammer. Again, increase the heat, fluidity begins; the particles now move over each other with the greatest freedom. At a still higher heat, repulsion ensues; the particles now repel each other. If in a close vessel the metal distils, becoming solid once more on the loss of caloric. May there not exist analogous actions, although more imperceptible, and of a more delicate nature, in the arrangement of the particles in the act of reduction by actinism, or in the toning by heated solutions? Would such a result be more wonderful or inexplicable than the following?—Take two parts of sulphate of soda, one of water, dissolve by a high heat; almost fill a glass vessel with the solution, set it aside to cool where it will be free from vibration. After having covered the mouth of a vessel with a card-board to keep out dust, and when cool, say three or four hours afterwards, take a glass rod, immerse it in the solution; crystallisation immediately takes place, radiating from the rod until the whole becomes a mass of crystals. Repeat the experiment, but this time heat one end of the glass rod in the flame of a spirit lamp. Then, after it has thoroughly cooled, immerse it as before. Mark the change; no crystallisation takes place, even although freely moved about in the solution. In the first instance, the motion communicated by contact with a piece of the same material as that holding the solution, but which has *not* been heated and cooled along with it, is propagated from particle to particle, until the fluid becomes a solid. An increase of caloric seems to have destroyed some property possessed by the end of the rod that was heated; on applying the opposite end, which has *not* been heated, crystallisation again takes place. The glass rod, if kept in a closed vessel, does not regain its original properties for about 14 days; in the open air, three or four days is sufficient. Here, once more, an immaterial agent acts a part that cannot satisfactorily be explained; at the same time, not more wonderful than bottling light, and photographing with it in the dark. If proof of the above could not be established, the assertion would be considered about as idle as the idea of the alchemists of old, that the inferior metals could be transmuted into the nobler. Nothing *material* added to or abstracted from; nevertheless, a body loses all its former properties and becomes possessed of new ones. Seeing the very remarkable part caloric plays in ordinary chemistry, is it not more than probable that its influence may be exercised to an equal extent in photographic chemistry, such as in the toning-bath? That heated solutions darken the image more rapidly will, I think, be admitted; but whether it fixes or puts beyond the further influence of light to a greater extent than solutions at the ordinary atmospheric temperature, time alone can determine. May there not exist particular points in the process, at which the *converse* of fixture takes place—at which the particles may arrange themselves in a manner ready to be acted on by a very slight disturbing force, such as the actinic rays? Have we not in the photogenic science a very striking example of opposite effects from a continuation of the action of the same cause? It is well known to all of you that a certain amount of exposure of one of the sensitive surfaces—viz., iodide of silver—to the actinic rays produces a certain effect, which is again destroyed by a prolonged exposure. Indeed, I attribute the great success in producing what are termed instantaneous results, to accident in shutting off the exposure in the camera at *that particular* time when the intense lights, such as from clouds and water at the angle of reflection, have, as it were, to a certain extent neutralised the atinic force after it had reached its maximum, the action of the high lights decreasing, whilst the feebler lights increase their force. For instance, let the subject be a highly-illumined landscape, with hazy clouds overhead, allow the proper exposure for the cloud to be *one* second, for the landscape five seconds; but suppose that five seconds would completely destroy the action established by the cloud rays, by shutting out the image say at three seconds, the action originally gained by one second will be considerably weakened. At the same time, the rays from the landscape will have been increasing in force, so that you can easily imagine a point when the two states of the atinic force will be nearly balanced, and an exquisite result attained. I had in my possession at one time a positive upon paper which during a few years underwent a succession of changes, until latterly the image became quite faint, and has all the metallic lustre of sensitised positive paper, that has been exposed for days to bright sunshine. There was undoubtedly a rearrangement of the particles of silver from the action of light itself; or, perhaps, in conjunction with some chemical unwashed from the paper; if the latter, it points out the necessity of thorough washing. About four years ago I varnished several paper positives with albumen in the state you get it from the egg. After being thoroughly dried I inclosed them in their frames, covering the back of them carefully to exclude dust. The whole of the delicate tints have now vanished, whilst others from the same negative—which were sensitised, printed, and fixed in the same solutions, but without the after coating of albumen—seem in no degree changed, although hanging side by side with the others. This must be due to the small quantity of phosphorus and of sulphur existing in the albumen, for combinations of the metal, both of which are subject to re-arrangement of particles under the actinic rays. This may also account for the very small quantity of hyposulphite of soda that will render photographs destructive, if not properly dissolved out of the paper. I may here mention an apparatus I used when working with small photographs, and which thoroughly separated all the loose chemicals from the paper in a few minutes. This was effected by first steeping any number of them in a large quantity of clean water, then passing them—several at a time—between a pair of glass rollers mounted for the purpose, the upper journals of which are acted on by stiff springs, so that a considerable amount of pressure was given out, at the same time neutralising any bad effects from the inequality of the rollers. This pressure could be increased at will by turning a pinching screw over the springs; the imbibed fluid being well expressed in each passage was immediately replaced by the clean fluid, into which they fell, and so on until satisfactorily washed. I found a very few minutes of this mode superior to hours of steeping, dripping, or pressure with a sponge. Brass rollers, electro-plated with silver, with a thin wash of gold on top of it, would be equally efficacious, and much more easily made correct—of course, in a system of this kind care must be taken not to use too much pressure, or elongation of the paper will take place. When on the subject of the fading of photographs, I will communicate for your investigation a theory that arose in my mind some time ago, but which circumstances prevented me from satisfying myself by experiment to the extent that I at one time intended, as follows:—The surface of sensitised paper that has been allowed to darken under the influence of the actinic rays, is considered, according to the atomic theory, to be composed of innumerable atoms of the darkened body, placed at inappreciable distances from each other—that is, every particle is surrounded by space, not filled with the body itself, and which allows room for freedom of motion under a disturbing cause; at same time, so nearly approximated that the highest optical power fails in discovering separation. Now, when chloride of silver is subjected to the ray power, a visible change takes place, doubtless effected by motion of the particles in the act of a new arrangement; also, accompanied by reduction of the chloride to metallic silver. We have only to imagine, during this change, one or more revolutions of every atom composing the external film of the chloride, which after the change may be considered as so many infinitesimal spheres, composed externally of reduced silver, internally filled with almost unchanged chloride, which has been protected from the further influence of light by the outer film. Now, in the fixing by hyposulphite of soda, you have only to conceive a partial thinning of the sphericles, which will bring them into a condition unable to resist the penetration of light under a continued exposure, which, by getting access to the inner chloride, will, by reduction, cause chlorine to evolve, which, in turn, will act upon the metallic surface by which it is surrounded, and, although producing the very substance (chloride of silver) that formed the image originally, will now exist under very different circumstances, and only darken to that faint violet tint so similar to faded photographs. By way of illustration, a similar action, but purely chemical, may be given—precipitate chloride of silver from an extremely dilute solution of the nitrate. It will fall in a very finely divided state. After washing the precipitate, pour over it a weak solution of aqua potassæ; boil it for a short time; stop the process immediately it is pretty dark, again wash, pour over it nitric acid, the darkness will disappear, the chloride appearing as before. This arises from the nitric acid dissolving the external coating of oxide of silver from the particles of the chloride, the boiling with potassæ not having been continued long enough to effect decomposition throughout the mass, and may represent a certain exposure of the chloride under actinism. Indeed, the same experiment can be made with the chloride which has been exposed for a considerable time under light. I am of opinion there is a considerable field in this direction for future investigation, and of a highly interesting nature. But knowing there is other business on hand this evening, I will trespass no further on your kind patience.

After a short conversation on the paper, Mr. Bowman exhibited a dark cell, for non-reversed pictures, which he had found to answer the purpose remarkably well.

Three miniatures on ivory, very beautifully coloured, were shown. They had been printed by Mr. Stuart's process, which was described by him at the last meeting, and were considered very satisfactory.

A vote of thanks was awarded to Mr. Kibble for his interesting paper.

The Chairman announced that, in consequence of the summer recess, the next meeting would not be held till the first Thursday in October.

The meeting then separated.

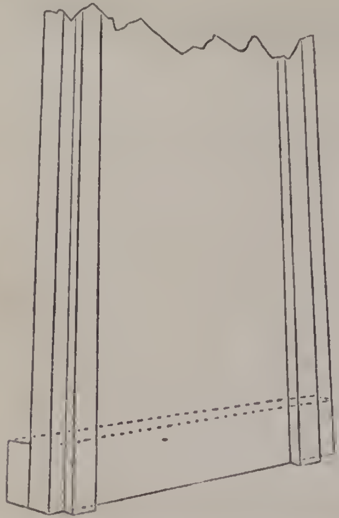
Photographic Notes and Queries.

SATURDAY HALF HOLIDAY.

Sir,—Your great circulation, as also your unwearied exertions in promulgating, through the medium of your journal, anything that will conduce to the well-being of photography, induces me to think that you will publish this note, being, in common with my photographic brethren, a weekly peruser of that truly artist-photographer's articles on "Chiar-oscuro," and awaiting, with no little impatience, the arrival of Friday, on which day I invariably receive my meed of gratification. But what is our condition? If you saw two boys, one holding a piece of meat to a dog, and the other preventing the dog from obtaining it, would you not compel the boy holding the dog to let go his hold? Is not the photographer in the same predicament as the dog, and does he not hope to receive a like release? Does he not have incentives held out to him in the hope that he will, through their agency, produce more artistic pictures than heretofore? And the valuable information given in your journal, by Mr. Lake Price, will undoubtedly introduce a fresh incentive to the photographer to persevere in his art, and not do as, alas! many do, make it a machine by which to obtain money alone, not caring anything about art. What we photographic operators want is, to possess the Saturday afternoon, so that we can visit our public galleries, and also to obtain fresh air; and then the value of those instructions will be fully appreciated. For who, by merely seeing an engraving of one of Turner's pictures, can understand their value, when it requires a magnifying-glass for you to see in the original painting how, with minute touches, he has portrayed everything, even to a blade of grass? Well, sir, you might confer an inestimable boon on photographic operators, both in their health and intellect; for your journal, as the organ of the photographic profession, might send forth such music as should arouse even the sluggish masters from their lethargy; and photographers would always be able to say that, while in you they had put their trust—providing that their cause was just—they used "*Nil desperandum,*" as their motto. J. B.

GLASS DIPPERS.

Sir,—In working a glass bath and dipper, I have found the dipper to cling so tight to the back of the bath that I have often dropt or spoilt the plate before I could remove it, which annoyance



I have overcome by cementing two strips of glass, ⅛th of an inch thick, to the back of the dipper, as shown in the drawing.

J. F. T.

THE FOTHERGILL PROCESS.

Sir,—I am not one of those individuals who can boast of taking out with me twenty plates and bringing back nineteen perfect negatives, but a humble plodder, who has found the Fothergill method give him a fair average of good pictures, taken in the intervals of business. I have no wonderful secret to convey to your readers, and only wish, on this occasion, to name an incident in my experience which has relieved me of a great annoyance. For a long time I found that every now and then a plate would show, on development, a patch running from the edge, quite insensitive, or partially so, spoiling my picture. I will not detail the many efforts I made to discover the cause, the books I consulted, the expedients I resorted to, the opinions of fellow-practitioners I had heard expressed, all terminating in nothing, but simply say that the whole cause of these provoking marks was leaving the plate for several days in the dark slide in contact with the mahogany. If any of your readers have suffered from this failure, let them seek for the cause in contact with *wood.*—I remain, your obedient servant, Wm. Phillips.

Shrewsbury, May 3, 1860.

MEETINGS OF PHOTOGRAPHIC SOCIETIES.

Thursday, May 17—South London Photographic Society.
Monday, „ 21—Blackheath Photographic Society.
Friday, „ 25—Photographic Society of Ireland.
Tuesday, „ 29—Birmingham Photographic Society.
Wednesday, „ 30—North London Photographic Society.

TO CORRESPONDENTS.

W. G. G.—Canson's positive paper: albumen 1 ounce; chloride of ammonium 12 grains; water 1 ounce; float, and remove the paper immediately. Drain and dry; nitrate of silver 40 grains; distilled water 1 ounce; no acid; float. On removal from printing-frame, wash in pure water two or three times. Tone; wash in plain water; fix in hypo. 1 ounce; water 4 ounces, soda 1 drachm. Wash in three or four waters; sponge the surface of the proof; add three or four drops of sulphuric acid to a pint of water, stir well; immerse the proof for half a minute; rinse and dry.

An Amateur in Trouble.—If the painting be of a dark tone, ten or fifteen minutes' exposure may be necessary, especially if the colours or varnish are of a yellowish hue. A small diaphragm must be used with the lens, and it is better to use a preserved or dry plate. This operation requires much patience and practice, and is seldom successful, unless every precaution and appliance is employed.

Odette.—Balsam of Peru is nearly analogous to Balsam of Tolu, but the tree yielding the first is not accurately decided. It is not found in Peru at all, but in Guatemala, St. Salvador, and the *Balsam coast* generally. Balsam of Peru is of a viscid syrupy consistence, of a reddish brown, almost black colour, and of a strong balsamic odour. It is entirely soluble in alcohol.

N.—Fill your bath with dilute sulphuric, nitric, or muriatic acid, and rub the sides with a bunch of quill feathers, rinse well, and finally pour in a little waste nitrate of silver, and fill up with water, letting it stand all night. If proper care be taken, it ought to be fit for use.

S. S. L.—1. One of the dry processes. 2. That which consists in the addition of rosin to the collodion. 3. Stereoscopic views at first; when *au fait*, proceed to larger pictures. 4. It will do, but very inadequately. You will require a twin lens stereoscope camera.

Sel d'Or.—We do not recommend a combined toning and fixing process. Tone first, and fix afterwards. Use Mr. Maxwell-Lyte's formula; it is simple and safe.

Focus.—Try an aplanatic lens. Whatever imperfections may exist, of necessity, in the best-constructed lens, they may be overcome by limiting its field of view, and the use of small diaphragms.

P. R.—To appreciate the effects of light and shade on your model requires some knowledge of chiar-oscuro. Generally, portraits show that too much light has been thrown on the sitter.

C. (Poole.)—Instantaneous photography requires a "quick lens," good chemicals, and apparatus in perfect working order, and an unexceptionable collodion. Develop with protonitrate of iron.

A. Z. (Leeds.)—In your present state of knowledge, no answer we could give would be intelligible. You must study for yourself. Begin with Johnstone's "Lectures on Agricultural Chemistry."

Sandon.—We have found the addition of as much loaf sugar as nitrate of silver to the bath answer in keeping the collodion moist during long exposure. But the bath must not be exposed to light.

Vexed.—Test your bath and see if it be not alkaline; if so, add a very small quantity of nitric acid, say, one drop in an ounce of water, adding a drachm at a time to the bath until it shows an acid reaction.

J. C. Brumwell.—The addresses of our correspondents, if not published, are sent to us in confidence. We therefore cannot comply with your request.

J. Tring.—Glycyrrhizine is not found to answer; it renders the collodion too uncertain.

H. P. (Oxford.)—Doubtless your bath is alkaline. Test it with blue litmus paper.

Orson.—You have not copied the formula correctly; it is drachms, not ounces.

Windsor.—You will find your query as to the magic-lantern camera answered at length in the present number.

Salix.—Your proofs will certainly fade if subjected to the treatment you propose.

A. B. C.—The simplest process is the most suitable for a beginner. Try waxed-paper.

Robert.—We suspect you have got common soda instead of hyposulphite; test it with a little acetic acid; if hypo., sulphur will be precipitated.

X. X.—If your ether turns litmus-paper red, we should consider it unfit for your purpose.

C. Varty.—You have doubtless misplaced the lenses, and had better take them to an optician, who will place them right.

O. O.—If you cannot succeed in making oxide of silver, you can purchase it at most chemists—not at apothecaries.

P. P.—We understand that such a book is "in the press." It will be noticed in these columns when published.

J. Cuffley.—You will find the French and English tables in the "Photographic News Almanac."

Angus.—The subject is fully investigated by Chevreul on the Law of Harmony and Contrast of Colour. Bohn's edition.

B. B.—We have not yet seen a camera constructed of aluminium, but hope to do so soon.

Lucretia.—Commence with positive printing. Almost any photographer will supply you with a few negatives to begin with.

An Amateur.—A stereoscopic camera will answer for taking miniature full-length portraits.

Focus.—Lenses at the price you name can only be "made to sell."

O. P. Q.—The formula has already been given in vol. II.

Z.—We have articles on the subject in preparation.

Anna B.—You will find what you require in our advertising columns.

Kells.—Fused nitrate of silver is generally sufficiently acid.

I. (Yeovil.)—We must decline your offer.

⁂ All editorial communications should be addressed to Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard, London, E.C.

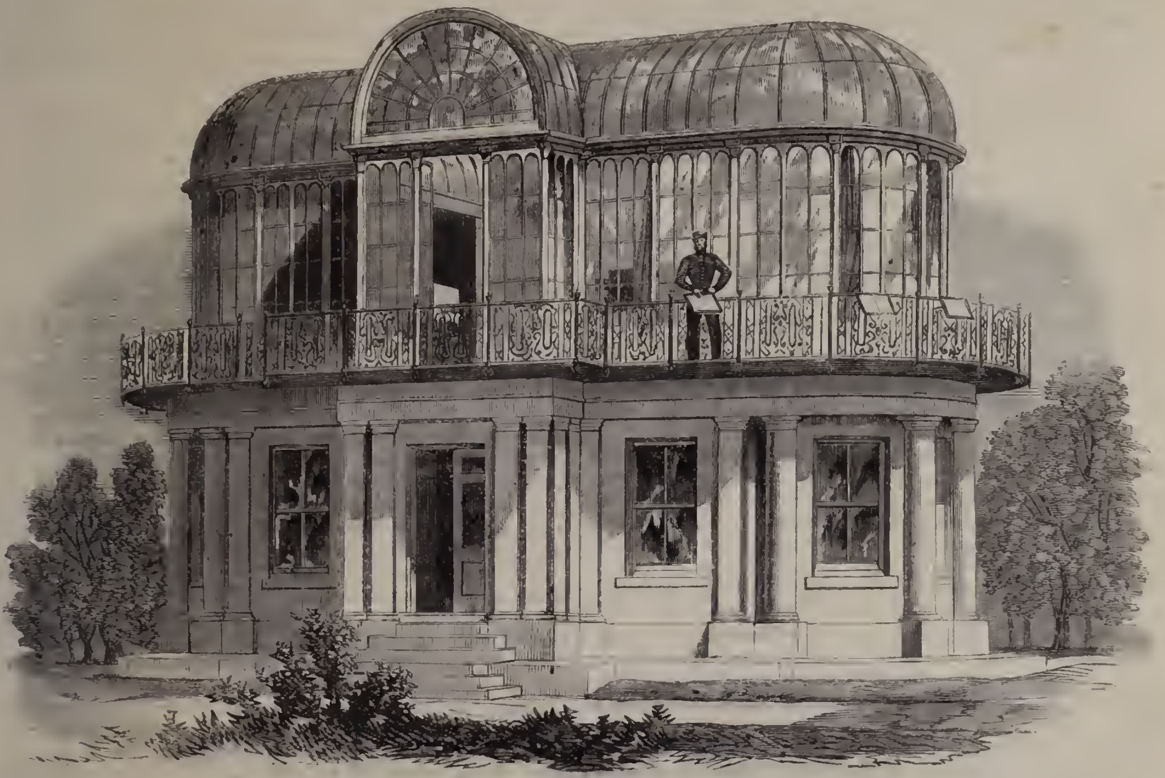
THE PHOTOGRAPHIC NEWS.

Vol. IV., No. 89.—*May* 18, 1860.

PHOTOGRAPHY AND ITS APPLICATIONS.*

THE PHOTOGRAPHIC PROCESS EMPLOYED FOR THE PRODUCTION OF REDUCED COPIES.

The process employed for the reduction of plans is that known by the name of the wet collodion process. A general description of the different operations is all that is considered necessary in these memoranda; detailed and minute directions in manipulating are given in all treatises on photography.



Perspective View of the Photographic Building constructed for the Ordnance Survey Department, at Southampton, designed by Colonel James, R.E. It consists of a basement of brickwork, and an upper storey of glass in iron framework.

Operations for Negatives.—The operations for the production of the negative are:—

1. The cleaning of the glassplate.
2. Coating the plate with collodion.
3. Immersion of plate in nitrate of silver bath, or sensitising the plate.
4. Exposure of sensitive plate in camera.
5. Development of image on plate.
6. Fixing negative plate.
7. Intensifying negative, including immersion in solution of bi-chloride of mercury, and washing with hydrosulphate of ammonia.
8. Varnishing negative.

1. *Cleaning the Glass Plates.*—The cleaning of the glasses used for photography is a point of considerable importance, and of more difficulty than would at first sight appear.

The delicacy of the chemical changes which unite in producing the negative is so great, that a very slight impurity on the surface of the glass has an effect in controlling or influencing them; and there is a special difficulty in the present case, from the effect produced on the glass by the bi-chloride of mercury used in process No. 7. This effect appears to be caused by the affinity of the mercury for the lead used in the manufacture of the glass; the consequence is combination of the two, and the mercury becomes, as it were, a part of the glass. Unfortunately, it only remains combined with the lead till it is brought into contact with the iodide of silver in the sensitive film; it then appears to decompose that salt, combining with the iodine, and rendering the film insensitive at those points where it existed previous to the immersion of the plate in the silver bath. The effect produced is that of a number of transparent spots on the negative.

In order, therefore, to render glass which has been once used again fit for photographic purposes, it is boiled in water for three or four hours—the greater portion of the mercury passes off with the steam; it is then immersed in a dilute solution of iodine, in order that the iodine may form a more stable compound with it. The glass plate is then rubbed with tripoli powder and ammonia, and placed in a holder (to avoid contact with the hands), dried, and polished with chamois leather. It is then ready for use; but, after all, where a little additional expense is no objection, it is better to use glass plates not more than twice, if they are submitted to the intensifying process.

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* Continued from vol. iii. p. 394.

2. *Coating the Plate with Collodion.*—The plate, held by a pneumatic holder, receives a small quantity of collodion—such, that a slight inclination of the plate may cause it to run over the whole surface; it is then drained off, and the evaporation of the ether leaves a thin film on the glass.

3. *Immersion of the Plate in the Nitrate of Silver Bath.*—The characteristics for a good negative are:—1. Clearness of the detail of the plan photographed. 2. Intensity of the ground of the negative. The condition of the bath, therefore, which is best calculated to produce good negatives, may be defined to be such, that the slightest decrease in quantity of the acid present will produce fogging in the detail of the negative.

The plate, when coated with the iodised collodion, and set, is immersed in the following bath for about five minutes, removed, drained, and placed in the ordinary dark slide:—

FORMULA FOR SENSITISING BATH.

Nitrate of silver	1 ounce.
Distilled water	2 ounces (dissolve).
Iodide of potassium	3 grains.
Distilled water	1 drachm (dissolve).

Mix these two solutions; the precipitate (iodide of silver) thus formed is, by shaking, entirely dissolved.

Now, add 14 ounces of distilled water, when the excess of iodide of silver is again thrown down, but in such a finely-divided state, as to render the saturation of the bath with iodide of silver perfect. After half an hour add alcohol, 2 drachms, ether 1 drachm, and then filter.

4. *Exposure of the Plate in the Camera.*—The time of exposure varies continually. The principal cause of the variation is in the quantity, intensity, and actinic force of the light entering the lens, and the range is from eight minutes to twenty-five seconds.

When the means employed to estimate the proper exposure are the eye and a watch, the variations are so rapid, and the plate so sensitive to them, that, on some days, forty per cent. of the negatives may be either under or over-exposed. These failures have been almost entirely obviated by the use of sensitive paper as a photometer.

The paper is prepared as for printing. A box, about nine inches long, two and a half inches broad, one-sixth inch deep, is divided in six, by interior partitions placed transversely across. Each of these portions thus made is closed by a sliding lid; the box is then hung up by the side of the plan-board, and in each compartment of the box is placed a slip of sensitive paper, the lids being then closed. At the instant the negative is exposed by the removal of the stop of the lens, one of the lids of the box is removed, so as to uncover one of the slips of paper. When the paper acquires that tone of colour which we know, from previous experience, indicates the time at which the plate has been sufficiently exposed, the cap is placed over the lens, and the lid is closed on the box containing the sensitive paper. If the negative appears to have been under-exposed (and the mistake may occur with the first negative taken on any day), the stop is not placed on the lens the next time till the paper has received a slightly deeper tone. While the next exposure is going on, the slip of paper first coloured is uncovered from time to time, in order that the eye may compare the tone with the one now in use. If the negative first taken is found to have been rather over-exposed, the exposure is stopped before the second slip of paper has attained so deep a tone; and, finally, if the development shows that the negative received the proper amount of exposure, the exposure of each negative subsequently taken is stopped when the paper has attained that tone.

Clearness of detail in the negative is the first essential; and the time of exposure must be regulated so as most perfectly to produce this result.

5. *Development of the Negative.*—When the plate has been exposed, it is carried to the dark room, and a proportion of the developing solution poured on it, sufficient to cover it. The fluid is kept in motion over the surface of the plate, and if there is any appearance of undue exposure, a small quantity of nitrate of silver is added.

The amount of development is, like the exposure, regulated by the essential condition of clearness of detail, and is carried to the utmost extent compatible with that. In cold weather it is advantageous to warm the developing solution.

FORMULA FOR DEVELOPING SOLUTION.

Pyrogallic acid	20 grains.
Glacial acetic acid	1 ounce.
Alcohol	6 drachms.
Distilled water	20 ounces (1 pint).

6. *Fixing the Negative.*—The negative, when sufficiently developed, is washed with water, and fixed with cyanide of potassium.

If the previous operations have been well performed, the process of fixing will dissolve from the detail every portion of the iodide of silver, and leave the lines perfectly clear. After fixing, the negative is washed with water.

FORMULA FOR FIXING SOLUTION.

Cyanide of potassium	15 grains.
Distilled water	1 ounce (dissolve).

7. *Intensifying the Negative.—Conditions necessary to produce a good Proof.*—It is found that when the plan is perfectly clean (as in the case of a new copper-plate impression) and the bath in good order, a negative can be produced (by development with pyrogallic acid alone) in good light, so dense in the ground and clear in the detail, that the resulting proof shall be only a slight shade darker in the ground than the paper of the impression, while the detail shall be jet black. If there is a failure in any of these conditions, viz., in the cleanliness of the plan, in the light or in the bath, there is a perceptible difference in the proofs.

Reason for intensifying Negatives.—The plans reduced are, for the most part, manuscripts, and pass through many hands. They are all considerably soiled in consequence, and thus one of the conditions for producing perfect impressions is wanting. It is found necessary, therefore, to intensify the negatives of MS. plans after they have been fixed.

Method of Intensifying.—For this purpose the negative is immersed in a saturated solution of bichloride of mercury, till it is thoroughly whitened; it is then removed, and washed with water. A dilute solution of hydrosulphate of ammonia, one to ten of water, is poured over the plate, so as to flow over the whole surface.

The ground of the negative is in this way converted into a sulphide of silver and mercury, and the film is of a brown yellow colour, and in great measure impervious to chemical rays. It is impossible to produce good prints unless the negatives of the MS. plans are treated in this way.

FORMULA OF SOLUTIONS FOR INTENSIFYING NEGATIVES.

1.	Bichloride of mercury ...	30 grains.
	Distilled water	1 ounce, or saturated solution.
2.	Hydrosulphide of ammonia	1 ounce.
	Water	5 ounces.

Immerse the negative in the solution of bichloride of mercury until it has become well whitened; wash with water, and then pour quickly over the plate the dilute hydrosulphide of ammonia, and again well wash with water.

8. *Varnishing the Negative.*—When dry, the negative is varnished with a solution of mastic resin in benzine. This varnish is only one-third of the cost of the best (amber in chloroform) kind, but answers very well when negatives are not to be kept for any length of time. For work requiring to be preserved, a better kind is required.

(*To be continued.*)

ON THE CAUSES OF FADING IN POSITIVE PROOFS.*

ON THE PRACTICAL MEANS OF PRESERVING POSITIVE PROOFS FROM FADING.

In briefly recapitulating the statements made in the previous portions of this article, certain repetitions necessary to be made will require apology: they are addressed to those who cannot follow the theoretical inquiries involved in this difficult subject.

1. A proof, to be permanently fixed, must be washed when taken out of the printing-frame, in order to introduce as little salt of silver as possible into the fixing bath.

2. The hyposulphite bath should be concentrated, so that the hyposulphite of silver resulting from the combination of a portion of the silver—which, with the hyposulphite of soda, forms the image—may not remain in the texture of the paper.

3. The fixing bath must only be used to fix a given number of proofs, according to its strength and their dimensions.

4. Not more than six proofs should be immersed in a bath of 1½ inches in depth.

5. Neither acid nor alkali should be added to the fixing solution, nor any other substance that can eliminate sulphur; or, if one of these substances be added, the bath must not be used until it has been allowed to stand 14 or 15 days.

6. Whenever an old bath of hyposulphite of soda deposits black sulphide of silver, it is no longer safe to employ it for fixing.

7. It is always preferable to tone a proof in a neutral gold bath, because the gold deposited upon the image preserves it from the action of deleterious gases always present in the atmosphere.

8. The proofs must always be well washed on being taken out of the baths, but the soaking should never be prolonged more than 24 hours.

9. The proofs should be mounted with a substance not liable to decomposition, which may render it acid; gelatine and starch, freshly prepared, are as good for this purpose as any other substances.

10. The proofs should be kept in a dry atmosphere, and, if possible, out of the influence of the atmosphere: this end is secured by preserving them in Harvey's patent portfolios.

The stability of photographs is further secured by varnishing them. The varnish may consist of pure white wax dissolved in an essential oil, and applied with a piece of flannel; or white lac varnish may be used. In the latter case, it is necessary to cover the proof with a solution of gelatine, and, when that is dry, to apply the varnish. The solution of gelatine is of the strength of 20 grains to the ounce of water, to which 20 grains of powdered alum are added; it is applied with a flat camel's hair brush. The lac varnish is applied with a piece of cotton wool, in the same manner as "French polishing" is performed.

(*To be continued.*)

SCIENTIFIC GOSSIP.

The chemical nature of the photographic image is a subject which must always be of interest to the man of science. It would be imagined, that the nature of the action of the sun's rays upon chloride of silver would have been one of the first phenomena for experimentalists to investigate; and, at first sight, this action would appear to be so simple, that it would require but a few careful experiments to decide its true nature once for all. Not so, however. As soon as investigators commenced to inquire into the subject, it became known that the action of solar radiation upon chloride of silver was one of reduction—chlorine being separated, and a compound, containing excess of silver, being left behind. Starting from this fact, theorists have divided into two parties, one of whom affirm that the chloride of silver is split up into chlorine on the one hand, which is evolved, and metallic silver, which remains behind as the colouring matter of the picture; whilst the other party holds that the reduction is not so complete—the ultimate product being a sub-chloride of silver, containing only half the amount of chlorine which was present in the original protochloride. The adherents of the former theory are principally continental *savans*, amongst the foremost of whom may be ranked MM. Davanne and Girard; whilst the Committee of the British Association, appointed to consider, experiment, and report upon this subject, consisting of Messrs. Hadow, Hardwich, Llewellyn, and Maskelyne, incline to the latter hypothesis.

Some of the most important experiments which have been made for some time in this branch of the science have recently been performed by Mr. Spiller; and the different steps in the inquiry have been so logically arranged, and the deductions which he draws from the results are so convincing, that we may consider that he has, at last, set the debated question finally at rest. He starts with the formation of chloride of silver in an extremely fine state of division, and in the presence of the full action of sunshine. This he effects by mixing together several gallons of a highly-dilute solution of nitrate of silver and of chloride of sodium, the former being in slight excess. The chloride of silver being thus precipitated in the form of an opalescent cloud, became rapidly blackened whilst suspended in the liquid, and finally settled into a dark purple-grey powder, sometimes tinged with green. A considerable quantity of this substance having been gradually obtained, it was submitted to analysis, and also to the action of numerous chemical re-agents. As might have been expected from the nature of the body, and the process employed for reduction, chemical analysis merely showed that the product contained less chlorine than the white chloride. This experiment alone, therefore, would not go far towards settling the question. When, however, he tried the action of different re-agents upon the darkened chloride, it was found impossible to arrive at any other conclusion than that it consisted of unaltered chloride mixed with pure metallic silver, whilst not a particle of evidence was obtained which tended to show that such a body as subchloride of silver existed. Ammonia, cyanide of potassium, hyposulphite of soda, iodide of potassium, &c., dissolved out the unaltered chloride of silver, and left behind a dark powder, which further examination proved to consist entirely of pure silver, without a trace of admixture of chlorine. These experiments are, in our opinion, conclusive. The advocates of the subchloride hypothesis have no other argument to produce against the above results, except that their theory also is capable of explaining all these facts. But, in order to make it do this, they are obliged to beg the whole question at issue:—first, that such a thing as subchloride of silver exists at all; and second, that if it is capable of existing, it is so exceedingly unstable, that mere contact with any re-agent which may be applied to it in order to prove its existence, causes its instant decomposition into chloride of silver and metallic silver. When, in the face of these assumptions, we assert that chloride of silver has never yet been either satisfactorily formed or analysed, and that dragging it in to explain the constitution of the photographic image merely complicates what would, on the other hypothesis, be a very simple reaction, without its being of the slightest logical value—we are forced to conclude, that when the simpler hypothesis is so fully capable of explaining all the phenomena, there is no necessity whatever for a theory which is obliged to rely for support upon the assumption of the existence of the hypothetical subchloride of silver.

Solar Eclipse of 18th July.—Great preparations are being made by astronomers and others for viewing the forthcoming solar eclipse, to which object photography is expected to lend most important aid. The Parisian arrangements are under the superintendence of M. Porro.

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* Continued from vol. iv. p. 2.

The Photographic Tourist.

A PHOTOGRAPHIC TRIP UP THE VALE OF NEATH.*

BY J. H. JONES.

As it was impossible to take a view of it from the side I had descended, I crossed over. The effect of sunshine on the cascade, when behind it on a fine day, is both grand and beautiful. The particles of water glittering with a silvery brightness as they fall; the uncommon brilliancy of everything without, seen through such a medium, contrasted with the dark green of the moss, everlastingly wet with spray; the dinginess of the rock; the damp and vaporous gloom of the atmosphere within, altogether form a singularly mingled scene of awe and gaiety. The dark hue of the basin below, deeply excavated by continual attrition, enhances the contrast of the thin, transparent fluid in its descent. After passing the cascade, I selected a spot where I could get in not only the fall, but also a great portion of each side of the dingle. I exposed two plates on this fall, which is known by the name of the Upper Cilhipste. I did it for the purpose of seeing what difference there was between the action of the light in this deep dingle and other places more open and exposed to the unconfined rays of the photographer's friend, bright Sol. The first plate had sixty-five seconds; the other, three minutes and a half. At the subsequent development, the first plate had not the slightest trace of a picture, although allowed to remain in a gallic acid bath for three hours. The second plate developed in about five minutes, and was, if anything, a little under-exposed. Skirting the side of the dingle opposite the majestic rock, I descended for a few yards. I came upon another cataract, but not of sufficient interest for a picture. I now had to ascend to the high ground a little, and, after making a short curve, came in sight of three more in immediate succession, and all four within an eighth of a mile from the first. The most considerable of these is about twenty-five feet high, and the smallest about ten; the last is the largest. These four are all seen at once; but, owing to a bend of the river, the great cascade, though so near, is not seen even from the first of these. Were the five visible at one point of view, they would nearly rival the great fall of the Mynach in Cardiganshire, below the Devil's Bridge; for though they would still be very inferior in point of height, the Hepste is much broader than the Mynach, and, in that respect, would have the advantage in point of grandeur. The whole of this dingle is profusely overgrown with wood of various kinds, among which the classic oak predominates. This fall, which is called the "Lower Cilhipste Fall," cannot be taken to advantage from the side of the river I was then upon; it was therefore necessary to re-cross it, but how to do so was the query. I told the guide that I wished to get to the other side, and asked him how it was to be accomplished. He replied, "By fording it, sir;" and, suiting the action to the word, in he walked, with the camera and stand. Of course, I must follow; but I took the precaution of going a little lower down where the river was more shallow, and supplying myself with a long pole, I managed to get across in safety with only one wet foot. The four falls from this point looked beautiful; a stump of a tree which had been washed over the falls had by some means got entangled in the middle of the lowest, and there it was in such a curious position, with a broken limb sticking out from it, that it had the appearance of a person pointing upwards to the fall; indeed, several persons have often asked me, when looking at the picture of it, if there was a man there, the appearance is so similar. Leaving this fall, and getting once more on the higher grounds, we struck into a scarcely discernible pathway, which winds round the promontory that separates the two dingles and their rivers; but there is a pathway, for the country people drive their cattle this way, and under the Cilhipste fall, when they have occasion to pass from the Melte to the eastern side of the Hepste. Threading my way now among the charcoal pits which lie around in all directions, and which, but for the guide, I should often have walked into, and after passing two or three stony, unproductive fields, we came upon the first fall of the Melte, which, although very small, is still very pleasing if there is sufficient water, as there was on this occasion. I levelled the camera at it, and, as a "volunteer" friend of mine remarked, "fired away a plate," and then proceeded to the Lower Clyn Gwyn Fall, which consists of four in succession, and are very pretty indeed. Few visitors ever see this fall to advantage, owing to their not taking the trouble to cross the river, and, consequently, go away with a mistaken or else a very imperfect idea of it; but if they were to take the trouble, they would be bound to confess that it had quite a different appearance altogether. I took a view of it from both sides, and few persons would recognise it as being one and the same fall. Indeed, it is very difficult, owing to its position, to get the exact spot from which to take it to advantage; and the point once gained should not be left, for a few yards on either side would detract very much from its beauty. I now had to re-cross the river, and wind my way about the sides of the rock over which the falls leap; and after some little time I arrived at a better pathway, and could walk once more with a little ease. The day was by this time drawing to a close, and by the time I reached the village of Ystradfelte I was very tired. The accommodation to be had here is of the very poorest description; but necessity has no choice, so I was glad to find rest and refreshment, were it ever so humble. I passed a restless, uneasy night here, and was glad when the morning came, to be able to get up and be away once more among Nature's enchanting scenes. Nearly opposite the church of Ystradfelte a large portion of the water of the river Melte disappears quietly under a rock; the rest flows over a well-worn bed for about three-quarters of a mile. Here a mass of limestone is thrown across the valley, as if to stop the escape of the waters. On approaching, however, you find a vast cavern, called Porth-yr-Ogrf. Walk a few paces to the right, and you see a pit. You hear the lost stream descending into it through the living rock; it unites with the rest of its waters shortly after entering the cavern. The top of this cavern forms the only bridge from one part to the other of the farm which lies to the east and west side of the river. The descent from the upper lands to the bed of the river is by no means difficult; nor does it at the first view present anything beyond a rural, quiet landscape; but, as the guide wound cautiously to the left, I suddenly found myself at the mouth of the cavern, the opening of which is about forty-three feet wide by nineteen feet high. Through this the Melte rolls with a sinuous course, wearing its channel through the rock—deeply perforated into fathomless pools—whence it issues into daylight, after a subterraneous passage of at least eight hundred yards. There is a practicable passage through it, but the attempt is imprudent. It is necessary to carry candles, and, if they are extinguished by the damp vapours, the difficulty and danger become very great; in one instance, a life was lost. I penetrated about a hundred yards, as far as any glimmering of daylight from the mouth directed me, and this specimen of Stygian horrors was amply sufficient to satisfy all rational curiosity. I thought to myself what a picture the interior of this cavern would make, if well lighted up; any person who will explore it as far as the natural light will lead him, may form a just, and, I apprehend, no contracted idea of the classical Avernus, and poetical descent into the infernal regions. Finding my way out of this wonderful cavern, I took a picture of the entrance, which forms a striking rock scene. After this the guide led me away over the top to the other end of the cave: here the Melte rushes out in a quiet stream, the creeping plants and dwarf trees around the entrance give it an indescribable charm, contrasting so vividly with the grey colour of the stone. I took two views of this end—one close to the cave, the other about a hundred yards distant. In the first picture I had the entrance only, in the second I had the river itself as well as the mouth of the cave. The first view was by far the best. From here the guide led me a considerable distance to the Upper Clyn Gwyn Fall, which should have been taken on my way from the lower fall to the village, only that the day was closing. Having reached the brink of a precipice, the great fall of the Melte disclosed itself in the depth directly below: it is much broader than the Hepste, and seventy feet high, and is very different from it in point of character; it projects more suddenly, and carries a larger body of water with more violence. It is, therefore, more awful and tremendous, but unaccompanied by those circumstances of variety and beauty which adorn and enliven its rival cataract. Here the rocks on each side are naked and abrupt, so that the dingle is divested of its accustomed clothing for a considerable space below the fall. There is also another point which it has not got to equal the Cilhipste fall, and that is, it cannot be taken from below, there being no means by which to get to the bottom, and, owing to the steepness of the rock, the attempt would prove fatal. After exposing a plate here, I diverged over high land to the right, crossing the Brecon Road, and descended to the falls of the Perddyn, which are the most elegant but not the most majestic of the Vale of Neath group. The upper fall, or "Ysgwd Einon Gam" (crooked waterfall), forms an inclosed scene of great beauty—contrasted rock and foliage. An air of grandeur is cast over the glen by the profoundness of its depth, the richness of its colouring, and breadth of shadow. The descent is fatiguing and difficult as you approach the bottom, but the view more than compensates for all the trouble and fatigue. Above you the agitated Perddyn leaps over the rock, under the shade of a trembling oak, to the depth of ninety feet. It is difficult to tear oneself away from this delicious waterfall. After taking two views of it, I shaped my course to the lower or "Sewd Gwladys Fall." Its height does not exceed forty feet, but it possesses a singularly graceful character, and bounds over the rock so rapidly that, on most occasions, you can pass under without receiving more than a few drops of water. A "Maen Hog," or rocking-stone, stood near this fall, weighing twenty tons, yet so "accurately poised that, by a push of the hand, a nut could be cracked against the adjoining rock"—a huge nut-cracker, I must confess. On Sunday, April 28, 1850, some "navvies," employed by the contractor upon the Vale of Neath Railway, wantonly overturned it. This was the last picture I took: and, after packing up, I once more made the laborious ascent of the hill, and came upon the Breconshire road. I know few things more delightful than the descent into this vale on a calm summer evening, after passing the untamable wilds of Cwmhlia—one of the most sterile and solitary tracks in the principality;—I know few scenes more refreshing than that presented from the rapidly-descending road to Pont Nedd Vechan, as the valley opens its arms before you near sunset. On the left, Craig-y-Llyn, king of the Glamorganshire mountains, sweeps boldly, yet with singular elegance, over a continuous line of shaggy woods; and dark groves—which also partly clothe the opposite heights for many miles—complete the delicious effect of the scenery. In a word, the characteristics of the vale are pale and russet mountains—with steep sides broken by exquisite ravines and many rills—rising majestically over a succession of wooded bases. Arrived at Pont Nedd Vechan, I stopped to dine, and sent the guide on with my apparatus to the Glyn Neath station. Having sufficient time on my hands, I walked very leisurely away from the village to the station. From the road I could see several miles of the Vale of Neath Railway gradually climbing from the rich vale beneath to the barren heights of Hirwain Wrgan, and carried across the mountain ravines upon elegant viaducts.

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* Concluded from vol. iv. p. 17.

While on my journey home, I felt a regret, at leaving this vale, such as I had seldom felt at leaving any place before; and, although I felt weary and fatigued with my five days' toil over hill and dale, and dirty, slippery mountain paths—and the distance I had passed over made me feel so—still I felt that I could with pleasure spend at least another week in this beautiful and enchanting valley, and find fresh objects each day at which to point the camera.

But the thought that I had brought away with me a stock of those precious tablets whereon I should find minute, but still faithful, pictures—painted by Nature itself—of this, perhaps, the most pleasing and lovely valley in Wales, made me feel *that* which the photographer and the real lover of Nature alone can experience. And what would be our beautiful art without this experience—this inward delight—which is often too deep for utterance, when, bending over the table of the laboratory or dark closet, we see on those magic tablets the faithful transcript of the sweet spots we have visited—at first dim and faint, but gradually increasing in strength, until, at last, it lies before our enraptured gaze a perfect landscape in miniature? Ask a photographer at such a moment—no matter whether he be our most illustrious professional, or a bewildered, but still perservering, amateur—if he would exchange his laboratory for a brilliant saloon, or his bottles of chemicals for the wine-bottle. His answer would, I am sure, be—*No!* and, perhaps, if he were on friendly terms with Shakespeare, he would cry, "Avaunt! and quit my sight;" *thy promises are joyless.*

Dictionary of Photography.

◆

Nitro-hydrochloric Acid, Nitro-muriatic Acid.—A mixture of 3 parts of hydrochloric and 1 part of nitric acids, called also *aqua regia*, as it possesses the property of dissolving the "king of metals"—gold. When these acids are mixed, the mixture becomes yellow; and, if heated, a yellow gas is disengaged, the odour of which resembles both that of chlorine and nitrous fumes.

Nitro-hydrochloric acid is not a mere mixture of the two acids, for both become decomposed. The nitric acid—which so readily parts with its oxygen—gives 1 equivalent, which combines with the hydrogen of the hydrochloric acid, and some water is thus formed. Of the chlorine set free, some escapes; the rest remains in solution with the nitrous acid formed; but an excess of either of the acids may remain, according to the proportions in which they are used.

When a metal is immersed in this acid, it rapidly dissolves, in the state of chloride, as it would do in a concentrated solution of chlorine. In *aqua regia* the metal encounters chlorine in the nascent state—a condition very favourable to combination. *Aqua regia* is a very energetic oxydising agent: it converts sulphur into sulphuric acid quicker than nitric acid alone.

Nordhausen Sulphuric Acid.—Ordinary sulphuric acid in its most concentrated state is a definite compound of one equivalent of acid and one equivalent of water, from which the latter cannot be separated by distillation; it possesses a specific gravity of 1·84. Nordhausen or *fuming* sulphuric acid consists of two equivalents of sulphuric acid and one equivalent of water, with a density of 1·90. It receives its name from a small town in the Hartz, which is a depôt for this acid manufactured in the vicinity. This acid consists of a solution of anhydrous sulphuric acid in monohydrated sulphuric acid, SO^3+HO. The combination of anhydrous sulphuric acid with water is accompanied with the evolution of a considerable quantity of heat; consequently, when this acid is exposed to the air, it combines with the moisture present in it, and disengages abundant fumes, producing the hydrated acid; hence the name given to the Nordhausen acid, *fuming*. When this acid is cooled below 32° Fahrenheit it deposits crystals, which belong to a hydrate containing less water than the monohydrated sulphuric acid, the formula of which is $2SO^3+HO$.

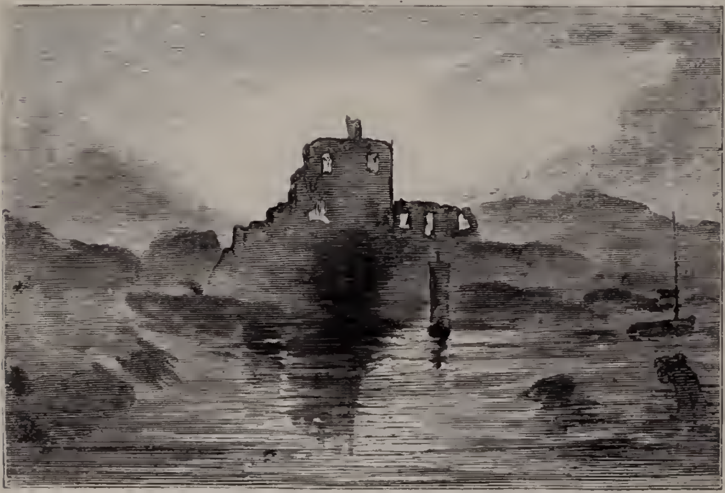
(*To be continued.*)

ON COMPOSITION AND CHIAR-OSCURO.—XIV.

BY MR. LAKE PRICE.

> "The accidental compositions of heterogeneous modes are dissolved by the chance which combined them, but the uniform simplicity of primitive qualities neither admits increase, nor suffers decay."—Dr. Johnson.

The arrangements of chiar-oscuro in the picture are as varied as the subject themselves in nature. Sometimes the principal light is in the centre of the compositions, as in sunsets or sunrises by Claude, Turner, &c.; the scale diminishing from the sun—represented by pure white—down to the marginal tones; but, in this class of subjects, the painter generally gives value and brilliancy to his light by the introduction of some dark objects coming off the sky, or water in immediate juxtaposition with it. Thus the well-known cypresses and stone pines, which Turner so often utilises for this purpose; and by Claude figures, boats, &c., are introduced with the same intention.

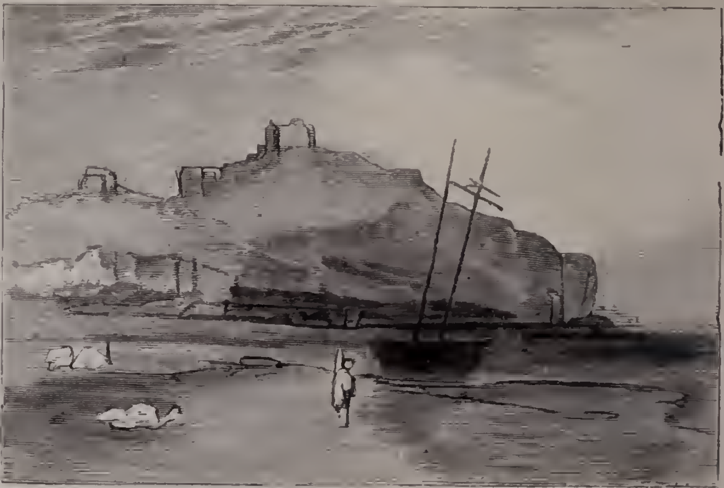


The contrary extreme—namely, that the *strongest dark* should occupy the centre of the picture, gradually diminishing into lighter tones—is equally susceptible of the greatest "breadth of effect." The fine subject of "Norham Castle," in Turner's "Liber Studiorum," is a masterly example of this arrangement. Here the dark mass of the castle occupies the centre of the picture, and is the focus of shadow, diminishing thence to the edges of the subject; the *principal light* of the sky being brought into immediate contact with the strong dark, the qualities of increased brilliancy and great breadth are simultaneously attained. The beautiful and poetic effect of this subject should animate some of our landscape photographers to endeavour to emulate similar effects rom Nature. The student will gain considerable knowledge of the capabilities of chiar-oscuro, in its application to landscape, by repeated and careful examination of the broad, varied, and masterly effects to be seen in Turner's "Liber Studiorum," which is in itself a compendium of light and shade applied to landscape composition.

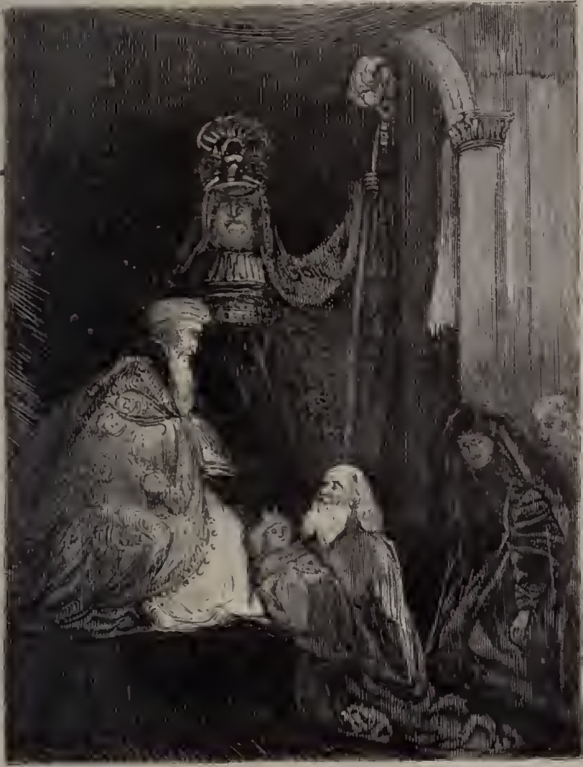
If any object in a picture, as a head, &c., were equally relieved in all its circumference, the effect would be unpleasingly dry and hard. It suffices that comparatively a small portion of it should be brought off in *vigorous* relief, the remainder being either slightly defined, or, indeed, some parts of it absolutely melted into the background depths, whereby not only is a flowing, rich, and broad chiar-oscuro obtained, but the power and verisimilitude of the representation is increased. In the works of Coreggio, Rembrandt, &c., we always see the illustration of this principle carried out in its greatest perfection.

Sometimes the darkest mass of shadow, instead of being brought *at once* in contact with the highest light, is—according to the nature and requirements of the subject—increased and intensified by the local colour of some object within it, which is an especially useful treatment in open air or landscape subjects, since the *atmosphere* of the general mass of the shadow is increased by the opposition of the intensified portion. In the chiar-oscuro of the subject below by Turner, "Scarborough," we see the principle illustrated. The cloud-shadow over portions of the sea and sands is concentrated by the dark hull of the vessel in the centre of it, which, in the most natural manner, varies its depth, and, rendering the remainder lighter, gives span and atmosphere without diminishing its vigour. This blot of the effect also shows the extreme *simplicity* and consequent *breadth* of the chiar-oscuro in this arrangement.

If the light portion of the subject is relieved upon the dark side of the background, and dark part upon the lighter background, great breadth and simplicity result from the arrangement, at the same time that the balance of the picture is well provided for, and that the decided and distinct opposition gives the greatest value to the respective lights and darks. In a vast variety of subjects, this principle will be found to be one of much utility, giving the full power of chiar-oscuro with a very natural appearance. The greatest genius and master of chiar-oscuro is Rembrandt; in him, we see the originality of perception and felicity of arrangement, which has served as a model to all subsequent painters who have studied the qualities of light and shade. We cannot, therefore, too strongly recommend the continued appreciation of his masterly combinations, as the "well head undefiled," from which the student may derive the greatest



insight into the powers of chiar-oscuro. In his works, all other considerations are secondary to the perfection of his light and shade. Very often the brightness of his light is obtained by diminishing its volume, and surrounding it by a considerable mass of dark, so that the light occupies only the twelfth part, or, indeed, less, of the subject; the resulting sentiment, conveyed to the mind of the spectator, being a gloomy and mysterious grandeur. This subject of "The Presentation in the Temple," is from one of his rarest and finest etchings.



The accompanying cut will serve to give some idea of the arrangement, but the inspection of the original will alone show the student the poetic grandeur which the *indefinite* mystery of its forms, dimly perceived through the obscure shadow, portrays. This is one of his finest "dark subjects." We perceive the highest light and greatest dark brought in contact in the dress of the priest and pedestal on which he sits, whilst the sparse light is repeated and carried up through the kneeling figure and architecture. Nothing can be more finely imagined than the grand half-seen standing priest behind; but, as mentioned, the original must be referred to for a perfect appreciation of a quality which it possesses, and which, IN ART, is *most difficult* of attainment, namely, the *vague* and *indefinite*, which leaves to the imagination of the spectator the completion of half-seen forms.

In Nature, if we look at the sun through portions of foliage, or in near contact with any other objects, we are quite unable to distinguish and define the forms which intervene between the strong light and our organs of vision; if it is a single branch, or any other isolated form, it is absolutely severed and abolished in that part, and that close observer of Nature, Turner, has so represented this effect in many of his sunsets, which are replete with that *hazy indistinctness of vivid light*, which is one of its leading characteristics. On the contrary, the "cast-iron" appearance of extreme definition is not only eminently un-"suggestive" and destructive of all poetry of feeling in a work of art, but is, although directly taken from Nature by the lens, entirely false to those appearances which present themselves to our visual organs, and, in the majority of instances, the cold, mechanical feeling of which critics complain in photographic representations, arises from the *over-definition* which has been sought for by the operator. The painter, in sketching and studying landscape, avoids portraying the effects of the mid-day sun, whose vertical light and black-defined shadows are the proverbial antitheses of those effects which are considered desirable in Art. The student, by bearing this in mind, will have the greater opportunity of producing an elevated and suggestive chiar-oscuro in his subjects.

(*To be continued.*)

A Catechism of Chemistry.

INTRODUCTION.

Q. WHAT position does Chemistry hold amongst the natural sciences?

A. Chemistry is one of the branches of experimental science.

Q. Are there other branches?

A. Yes; physical science.

Q. Give a definition of chemistry.

A. Chemistry makes us acquainted with the composition of bodies, and the mutual changes which they induce.

Q. In what does chemistry differ from physical science?

A. Physical science only treats of the action of matter on matter, without any regard to its internal constitution.

Q. How may chemistry be subdivided?

A. Into *pure* or *theoretical* chemistry, which includes physical, mineralogical, physiological, medical, and agricultural chemistry; and into *applied* chemistry, including analytical, pharmaceutical, and technical chemistry. The former subdivision may be looked upon as the *science*, and the latter the *art* of chemistry.

Q. May it not be subdivided into two other great divisions?

A. Yes; into *inorganic* and *organic* chemistry. This classification is, however, only adopted for convenience, having no real existence, as the two classes merge so imperceptibly one into the other, that it is impossible to establish the boundary line.

Q. What is the usual definition of organic, as distinguished from inorganic, chemistry?

A. Organic chemistry treats of those bodies which are derived from *organised* bodies, or bodies which have possessed organic life; whilst inorganic chemistry treats almost exclusively of the chemistry of the mineral kingdom.

SECTION I.—CHEMICAL PHYSICS.

Chemical Affinity.

Q. What is meant by chemical affinity?

A. The attraction which one body exercises for another to form a third body, differing in physical appearance and properties from either of its constituents.

Q. Give an illustration of this action of chemical affinity.

A. A piece of iron, when exposed to atmospheric influences, is acted upon by the chemical affinity which the oxygen of the air has for it, and becomes converted into *rust*, which is a chemical combination of iron and oxygen.

Q. Rust, therefore, is composed of iron and oxygen. What is iron or oxygen made of?

A. Both iron and oxygen belong to the class of what are called *elements*—that is, bodies which have hitherto resisted all attempts to reduce them to simpler forms.

Q. Name some of the elements which are most frequently met with.

A. Most of those which are familiar to us are metals, such as gold, silver, copper, iron, lead, tin, mercury, and zinc.

Q. Is not brass an element?

A. No; brass is a *compound* of the two elements copper and zinc.

Q. Are all the common elements metallic?

A. No; some have no resemblance to metals, such as sulphur, charcoal, and phosphorus. Others, again, are invisible gases, such as oxygen and nitrogen—the constituents of the atmosphere. Some few are visible gases, as chlorine, which has a greenish colour.

Q. How many elements are there?

A. Sixty-one. Some, however, of these are excessively rare, and have only been seen by one or two persons.

Q. Are the elements capable of division into classes?

A. Yes; there are two great classes, the metallic and non-metallic.

Q. What is the constitution of the various bodies we see around us in nature?

A. They are mostly compounded of two or more of these elements, united together according to definite rules and proportions, and are therefore called compound bodies.

Q. Are not earth, air, fire, and water, elements?

A. No; not in the sense which chemists attach to the word element. Earth is a general name, applied to a great variety of substances, mostly consisting, however, of definite combinations of certain metallic elements with oxygen. Air is a simple gaseous mixture of the two elements, oxygen and nitrogen. Fire is not a substance at all, but an effect produced by energetic chemical combination between different bodies; and water is composed of the two gases, hydrogen and oxygen.

Q. Why, then, are these usually called the four elements?

A. Because, in the popular acceptation of the word, they are the elements of which natural objects are formed. Earth, water, and air, stand for the three great physical conditions of matter, the solid, liquid, and vaporous; whilst fire represents the forces which produce life and motion upon the earth.

Q. Are there many combinations of elements?

A. They are almost infinite. In this respect the elements may represent the different letters of the English language, whilst the compounds would be the words formed by the combinations of these letters.

Q. How can it be decided to what class of bodies any particular substance belongs?

A. By an examination of its physical and chemical properties.

Q. What is the difference between the physical and chemical properties of a body?

A. A physical examination of a substance, silver, for instance, would show that it was a hard, opaque body, possessing considerable weight, of a white colour, and having a peculiar lustre (termed metallic) when polished; that it could be beaten or rolled out into thin sheets; that when sufficiently heated it would become self-luminous and liquid, &c.

Q. What, then, would a chemical examination of silver show?

A. That it was an elementary metallic body, having so slight an affinity for oxygen that it would not attract it from the atmosphere at ordinary temperatures; that it was capable of entering into combination with oxygen by adopting suitable means, forming an oxide, which again was capable of forming a vast number of well-defined salts; that it would also unite chemically with sulphur, chlorine, bromine, iodine, &c.

Q. Is it possible to separate a physical from a chemical examination?

A. No; physics and chemistry are so intimately connected and mutually dependent one on the other, that it has been found impracticable to separate them; and for this reason any instruction in chemistry is always preceded by a brief outline of the most important physical characteristics of bodies.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 14th May, 1860.

I have sometimes alluded in my letters to photography as applied to botany, anatomy, astronomy, and other sciences; why should we not see it delineate the varied strata of the earth's crust, the curves of the snow-line, or the different zones of vegetation on the mountain side? A well-known geologist, M. Elie de Beaumont, has, doubtless, hinted this to M. Civiale, a French photographer, whose views of the Pyrenées I noticed at the time of the Photographic Exhibition at Paris. On the strength of the hint, M. Civiale hastened to Switzerland, and there obtained an excellent series of photographic proofs, which have been recently laid before the Paris Academy.

The apparatus employed consisted of a bellows-camera, made very light, and mounted upon four legs, and very steady. The focal length of the combined object glasses is 28 inches in the sun; the image produced upon the ground glass is 15 inches by 11 inches. To the apparatus are fixed an air-level and a small goniometer, for taking vertical and horizontal angles.

The proofs above mentioned were taken on dry waxed paper, iodised in a bath of cerolein, and the length of exposure varied from 17 to 19 minutes (July and August). To render the proofs obtained valuable for scientific purposes, it is necessary to determine the station, the height above the level of the sea, and the direction of the optical axis of the instrument for each proof, or at least for the two extreme sheets when the panoramic proof is composed of a number of sheets joined together. By consulting a good map of the country, the distance from the station to any other point upon the panoramic proof is easily obtained. It is, moreover, necessary to determine the horizontal angle within which the whole view is comprised, and to take, by means of the goniometer, the different vertical angles formed by the various mountain-peaks which reach above the station point, in order to ascertain their relative heights above the latter point.

The proofs presented to the Academy by M. Elie de Beaumont comprise panoramic views, and an album of details, taken in the eastern portion of the Bernese Oberland, a district where the upheaval of the strata has been very great. M. Civiale says the forms of the mountains are far better indicated when the latter are covered with snow.

M. Elie de Beaumont, on presenting these panoramic proofs to the Academy, noticed the striking manner in which certain details, which are very difficult to obtain in drawings, were here rendered by photography; such are the varied forms of the glaciers, the polished and striated rocks near Grimsel, the glaciers of Aar, the peaks of the valley of Grindelwald, &c.

The manufacture of paper from other materials than rags is, more than ever, an important question of the day. Straw-paper cannot yet be said to have attained the superior qualities of rag-paper; it is, indeed, deficient in many respects, more especially by its brittleness. Dr. Reissig has, however, lately published, in the German papers, the whole details of a process he employs, or has employed, with success, and by which very good paper is produced from straw. I have always thought that the straw-paper manufactured, up to the present day, owed its inferiority to want of care, and too great rapidity in its preparation. Dr. Reissig seems aware of this:—The first operation consists of cleansing the straw and freeing it from the stalks of any other plants, which are generally very difficult to bleach. It is then cut up into fragments, about one-third of an inch in length. The knots are separated from the other portions of the stalk by means of a fan, and the latter are submitted for some time to the action of steam, to dissolve out all the extractive matter; this operation is continued as long as the water which condenses is coloured, and until the straw is quite soft. The operation is accelerated by the addition of about 10 per cent. of caustic lime. Dr. Reissig says that superheated steam gives the most satisfactory results.

The straw is then placed in a boiler and submitted to the action of 12 to 16lbs. of *carbonate of potash* in solution to every ton of straw (experiments appear to show that soda does not act so well). After boiling for some hours, the potash solution, having dissolved the silica of the stalk and various other matters, is separated, and the straw, which has now become soft and flexible, well washed and carried to a mill, where it is transformed into pulp. When the action of the potash solution takes place under a pressure superior to that of the atmosphere, comparatively small proportions of alkali readily dissolve out all the silica from the straw. The pulp obtained is transferred to wooden troughs, and to it are added 4 or 5 per cent. (of the weight of pulp) of sulphuric or hydrochloric acid. The action of the acid must be allowed to continue for many hours, as it takes a long time to mix with the water contained in the pulp. The acid water is then drawn off, and can be employed in the subsequent operations. The bleaching material is then added: it consists of *hypochlorite of magnesia*, obtained by precipitating 1 part of chloride of lime dissolved in 12 parts of water, by 2 parts of sulphate of magnesia dissolved in 12 parts of water. The sulphate of lime is allowed to deposit, and the hypochlorite of magnesia carefully decanted off. In two or three hours the pulp is completely whitened. It is then washed with care, and any free chlorine it may contain absorbed by *sulphite of soda*. A last washing now takes place, after which the pulp is divided, sized, and submitted to the paper machines.

M. Lautemann has published a new method for obtaining pure *lactic acid*, which differs a little from the one I noticed some time since in the "Photographic News." The mixture, which is submitted to fermentation, consisted, in M. Bensch's process, of 2,000 parts of cane-sugar, 15 parts of tartaric acid, 13,000 parts of water, 250 parts of old cheese suspended in sour milk, and 1,500 parts of chalk. M. Lautemann replaces the chalk by oxide of zinc, and employs one-third more water. The temperature, during fermentation, is kept at 40° to 45° (centigrade), and the mixture frequently stirred. In eight or ten days the operation is terminated. The liquid is then heated to ebullition, filtered through a cloth, evaporated, filtered again, and made to crystallise. A second crystallisation furnished white lactate of zinc ready for the preparation of pure lactic acid.

To obtain this acid, the salt is dissolved in boiling water, and precipitated by sulphuretted hydrogen. The liquid, after being filtered and evaporated, soon solidifies by the precipitation of a certain quantity of mannite, which always remains mixed with the lactate of zinc.

If the solidified mass be dissolved in the smallest possible quantity of water, and the solution treated with ether, the latter takes up all the lactic acid and leaves the mannite behind in the water. On evaporating the ether, pure lactic acid is obtained.

A small wild plant, *glaucium flavum*, closely allied to the poppy tribe, has been recently studied from an industrial point of view by M. Cloez, of Paris. This little plant is common enough in our climate, and in England, where, I believe, it is called *yellow-horned poppy*; it is frequently remarked, during the months of July and August, on the sandy sea-shores, where it expands its large, handsome, yellow flowers, which are succeeded by pods from six to ten inches long. This plant, were it cultivated in large quantities, would become extremely useful. According to M. Cloez, its seed loses only 8 per cent. of water when dried in an oven, and, after drying, contains 42½ per cent. of a siccative oil, which can be used as an aliment, and for burning. In its ordinary state, the seed yields, by pressure, 32 *per cent.* of this oil. The residue which remains (the seed-cake) constitutes a valuable manure, giving, on analysis, 6 per cent. of nitrogen, and an ash amounting to 14½ per cent. rich in phosphate of lime.

There is no doubt that this handsome-looking plant might be profitably cultivated on the rocks or sand-hills of our shores.

INSTANTANEOUS PHOTOGRAPHY.

To the Editor of the "Photographic News."

Sir,—In common with the rest of your readers, I have perused, with much interest, the able paper contributed by Sir J. F. W. Herschel, in No. 88. What may not photography hope to achieve when the strong master-minds of the day come forward to point out a path for it, and, by wise and trustworthy suggestions, instruct how that path is to be pursued? Patient experiment and wearisome tasking of the brain may lie between the suggested results and their realisation, but that they will ultimately be realised is highly probable—I had almost said, certain. A virtually instantaneous picture can, I apprehend, even now be obtained; and it may be assumed that a pair of pictures for stereoscopic effect is equally attainable. If this be so, there does not appear to be any insurmountable mechanical difficulty in the arrangement of a number of stereoscopic cameras, all ready furnished with sensitised plates, and accurately focussed for a virtually common point, to take pictures in rapid and regular succession;—so rapid and regular that the phenakisterscopic illusion of motion and action shall become a startling and marvellous truth. If it were desirable, what should prevent a hundred cameras being *fired off* with exposures and intervals of one-sixth of a second? Suppose them to be so fired off, and that one hundred pairs of stereoscopic pictures are produced, recording an action of nearly seventeen seconds in duration, what should hinder the mounting of at least a portion of these pictures on a large disc, pair after pair, with equal intervals between every two pictures? where the difficulty of giving this disc an uniform rate of rotation? and where the impracticability of applying the principle of the *photodrome* to illuminate the pictures in succession, and at once produce stereoscopic relief and the veritable action of life? May we live to see it, some will say; I answer, Grey heads may live to see it.

Before the camera can give us natural colour, much that is now capricious in photographic action must be got rid of. The actinic force resides meantime principally in the blue, feebly in the yellow, and scarcely at all in the red; and this invasion of the spectrum must by some means be corrected, as a step towards obtaining the individualisation of natural colour. A great advance will have been made, when chemical science has given us materials and processes by which the yellow light shall be most powerful, the red of medium power, and the blue least active of the three; and when the secondaries, orange, green, and violet, shall range under the same law. Without opening up a discussion on the homogeneity of light, it is enough to say, that relative colour *does* result from the radiation of a greater or lesser quantity of light from a focal point in an imperfect reflector; and it is not a violent assumption, that from every point in a given object such a radiation of light proceeds, as is necessary to give it its distinguishing colour, which colour is heightened or lowered by contiguity with other objects radiating light in different degrees. If this is tenable, we are warranted to expect true colour in our photographs, so soon as we can bring the actinic force into strict relation with the manifold radiations of light from all the elements of the scene to be depicted.—I am, yours obediently, Thomas Rose.

Glasgow, May 15, 1860.

MAGIC-LANTERN CAMERA.

To the Editor of the "Photographic News."

Sir,—If you will not consider me troublesome, and occupying too much space in your journal, I wish to reply, briefly, to your correspondent, "Thomas Rose." In his letter, he remarks that I do not enter into the question of adapting the camera to a magic lantern. If Mr. Rose will reperuse the former part of my letter, he will observe that I did—like "Apocryphal"—signally fail, and, therefore, give no encouragement at an attempt to combine the camera and lantern in one. Finding this impracticable in my hands, I set about converting that portion of my apparatus suitable, viz., the lenses, which answer remarkably well, and in the construction of a *lantern* forms an important item. They are *the lenses*, simply unscrewed from one box to the other, and which does not occupy more than half a minute.

By this method, according to Mr. Rose's statement, nearly one half in expense is saved; he recommending an expenditure of £4 or £5, whereas the requisites for mine cost under £3, and now forms a very first-rate apparatus. I should be sorry to advise what might be termed false economy, by constructing a cheap but inferior lantern, &c. Still, I think there are many amongst your numerous readers who will gladly save a pound when it can be safely and effectually accomplished.

With reference to the light, I have tried nearly all descriptions of patent burners, including the argand, and find none answer equal to the one mentioned in my last letter. It is quite possible others may succeed better with different descriptions of gas-jets; a comparative test alone will solve the problem. I should like to hear from your correspondent his method of etching, and toning, or colouring photographs. Foliage, I think, would be greatly improved by a little colour, judiciously applied. I very much desire to correspond direct with one or two of your subscribers that may feel interested in this. A good deal of useful information might be conveyed to each other; at the same time, save you, sir, the trouble of publishing so many letters on one subject.—I am, Sir, yours very respectfully, T. R.

Colne, May 12, 1860.

To the Editor of the "Photographic News."

Sir,—I think the photographic world is under great obligations to "T. R." for his letter in No. 87 of your very interesting miscellany. But, since I wrote to you under the signature of "Apocryphal," I have had a conversation with the first optician in this town on the arrangement necessary to adapt the camera to a magic lantern. Like "T. R.," he said there must be a pair of condensers, which, from his description, I take to be a double convex, and a meniscus lens, brought together, and set in one hoop of tin-plate. They are four inches in diameter, and one inch in thickness. In one thing, however, he differed essentially from "T. R." as to the expense; he said, he could supply them for nine shillings. For the sum named in "T. R.'s" letter, one may buy the whole lantern complete—not quite so large, perhaps, but still a very respectable size. I think, at the price referred to, many would be deterred from further trial; but at the one I name, they might venture another trial; and as most photographers have a mechanical genius, probably the box, &c., will not be an insuperable difficulty.

And now, with regard to the light, I think the experience of "T. R." is worth a thousand theorisers. The time was when a simple oil lamp would satisfy an exhibitor, but even the argand burner of a gas-light is not sufficient now; and I think the reason is, that our transparencies are not so transparent as they were then, for is there not, after all, in the clearest parts, a filmy opacity remaining, which requires a superior light to penetrate? for I presume the collodion is not entirely removed in the operations, and hence the untouched whites of former days were much more diaphanous than photographic transparencies of the present day. I fear, however, that the lime light is too expensively got up to allow of amateurs indulging in exhibiting the beauties of photography on the screen. Permit me to write no longer "Apocryphal," but

Hopeful.

Proceedings of Societies.

◆

South London Photographic Society.

A special meeting of this Society was held last evening in the Lecture Hall, Walworth. W. Ackland, Esq., Vice-President of the Society, occupied the chair.

The minutes of the previous meeting having been read and confirmed,

The Rev. F. F. Statham, the President, then proceeded to read the following paper on

THE APPLICATION OF PHOTOGRAPHY TO SCIENTIFIC PURSUITS.

He said,—The rapidity of execution and the accuracy of detail which characterise impressions of objects taken by the aid of photography, might seem to point out this art as one calculated to be of the utmost service to philosophers of all denominations in carrying out their experiments, or in recording the results of their researches. But it is only by slow degrees, and as chance has suggested the adaptation of the photographic art to the advancement of various branches of science, that the importance of their correlation has been recognised, or the aid which photography is so capable of rendering been duly appreciated. The object of the present paper is not so much to chronicle the services which have already earned for photography a just title to be regarded as the "handmaid of the sciences," as, by a brief survey of some of the benefits hitherto conferred, to awaken public attention to the wide field of usefulness opened up by the discovery of this invaluable agent, and to suggest one or two additional spheres in which, possibly, the use of the camera may be hereafter rendered available. To give a just and accurate idea of *all* that photography has done for science, would be to write anew the whole history of the art, and for this I have neither the time at my command, nor the requisite ability to grapple adequately with the task; but I have thought that a few plain observations from one warmly devoted to the interests of photography—though not even pretending to a practical acquaintance with the manipulatory branches—might call attention to the subject, and induce other labourers, much more competent than myself, to work out this theme in a way which its importance deserves. And, first of all, for the aid which photography has rendered to *Chemical Science*. It is true that photography is the child of chemistry; and we might, perhaps, more justly inquire what have been the services bestowed upon the photographic art by the agency of chemistry, than put the question of the benefits conferred in the opposite way. But I am prepared to maintain that, if a child once, photography has been a grateful child; and now that she has arrived at a state of maturity, she is repaying the advantages received in her condition of pupilage with a most bountiful interest. The practice of photography has so popularised the chemical art, as to have called into existence a new generation of chemical students. It has infused a wonderful zeal into the study of this fascinating science, and has caused thousands to read the works of our most established practical and theoretical chemists, who would never, but for their love of the photographic art, have consulted their pages. Add to this that, by necessitating a vast increase in the number of chemicals, it has originated a laboratory of its own; it has called into existence several totally new combinations of matter, and has wonderfully cheapened the cost of production of many of the most useful chemicals and drugs. Depending, as it does, for success so much upon neatness and skilfulness of operation, photography has gradually taught the young chemist qualities all-essential to the attainment of perfection in his favourite pursuit; patience, which will not be defeated by the failure of several experiments; the most scrupulous cleanliness in preparing and manipulating his apparatus; self-reliance, when, by perseverance and industry, he has once thoroughly mastered the processes of his art; and a spirit of inquiry and adventure, which will prompt him to seek out new modifications of matter, or to note, with a philosophic eye, any unexpected or not easily-explainable appearances which may present themselves during the prosecution of his experiments. I apprehend that chemistry, as a science, is only just beginning to reap the fruits which it may hereafter anticipate from the wide diffusion of a taste for photography among the choicest intellects of our land. Just as the alchemists of old, while spending their lives among crucibles, and alembics, and furnaces, in the pursuit of a totally different object, still fell occasionally upon the discovery of some new compounds, which after experience proved to be of the most vital consequence to the advancement of chemical science, so I conceive it to be impossible that so many new labourers can be imported into the wide field of photographic experiment without occasionally picking up, in like manner, some jewel of philosophic worth, which may, hereafter, open new sources of discovery to the chemists of future generations; or establish still more firmly the value and importance of the existing body of chemical truth. Who can deny the probability that we may even now be nurturing some embryo Davy or Liebig among our young and ardent photographers, when he considers how intimate is the connection between the two classes of truth, which are the mutual objects of pursuit of the chemist and the photographer—how each depends upon the other for information and aid—and how both are fired by the same glowing ambition to make some new discovery which may be useful to mankind, or serviceable to the cause of philosophic progress generally! I pass on, however, to another branch of science, which has derived no inconsiderable aid from the appliances of the photographic art: I mean *Geology*. There is, perhaps, no science which is more indebted to the arts of accurate delineation than the science of geology. To be able to give a just idea to another of any peculiar physical feature—say, for instance, of a landslip, or a section of a coast, or the crater of a volcano, or the aspect of a mountain range—how thoroughly inadequate would all mere verbal description be! We feel at once that a few rude outlines with a pencil, or a rudely-coloured draught taken on the spot, would convey a much more correct impression of such an object or scene than whole pages of printed matter or oral explanations, however lengthy and diffuse; and hence all our standard works on geology are most profusely illustrated; and the amount of artistic skill which is to be witnessed in some of the more costly of them, is of itself a source of great attraction. Now I am not going so far as to assert that, under all circumstances, a photographic view of any scene of geologic interest would possess indubitable advantages over the sketch made by hand and colour, according to the tints observable in the natural landscape. Geologists are the anatomists of Nature. They are not blind, it is true, to the grandeur and sublimity of the scenery of Nature; but, as a rule, it does not accord with their especial object to spend much time in the mere act of admiration. They generally want to get at the origin of physical appearances; and hence they are continually on the search for sections of the earth's crust which may reveal the superposition or the relative connection of beds, or for sea-coast views, or railway cuttings, where the internal economy, rather than the beauty of the outward surface, may be revealed. But still there are dozens of cases in which accuracy of detail is of the utmost consequence to the geologist, in order that he may preserve the memory himself, or convey correctly to others the results of his discoveries in the dark bowels of the earth; and where, on a large scale, any striking phenomena are to be delineated, it is obvious that the camera must be of the utmost value, if it be only to furnish the outlines of the sketch, to be filled up subsequently by separate visits to the individual parts, or to serve as an *aide-memoire* from which to draw, with the graver or pencil, an enlarged copy. In many instances—as in the delineation of fossils, or the transcribing of scenes of geologic interest, which would occupy hours and hours of hard labour in mere hand-drawing—photography may be rendered most highly instrumental to the cause of geologic science. As examples, I place upon the table stereograms of some tertiary fossils recently found in the tunnelling for the great high-level sewer at Dulwich, and views taken in the Scilly Islands a few summers ago, of disintegrated granite masses—rocks, basins, and other scenes, possessing an interest to the geologic student. My belief is, that a series of well-executed photographs of all the characteristic fossils in our national museum would be of the utmost use in an educational point of view; and that the illustration of works on geology, by means of photographic agency, would be a vast improvement upon the systems now so generally in vogue, where the cost of production renders first-rate illustrations all but impossible, except in works produced and sold at a very high price. I come next to speak of the application of photography to *Medical Science.* In what way can this useful art be rendered subservient to the advancement of this all-important subject? Why, plainly by multiplying accurate copies of every varying form of disease by enlisting the camera as our most faithful transcriber of the successive changes of symptoms in sickness, and of the difficult presentments of morbid anatomy in general. At most of our principal hospitals the necessity of preserving a correct record of peculiar forms of disease has led to the retention on the permanent staff of the institution of one or more experienced draughtsmen and modellers in wax, who may be at hand to copy from the living patient or the dissected corpse any appearance calculated to throw a light on the origin or progress of the malady, or to form a useful subject for study in the future treatment of similar classes of disease. Now, I cannot but think that, even here, the marvellous rapidity of execution, and the minute fidelity of the photographic picture, give it an advantage which would render the appointment of a professional photographer also a most desirable addition to any hospital staff; for, very frequently, the changes in the progress of disease are sudden and striking, and before an accurate copy of them could be made by hand, the patient may die, or a successive change may come on, and so the rare opportunity be lost of chronicling some evanescent, but important feature of the particular case. With the aid of the camera, I can contemplate the time when every varying phase and form of disease will be as familiar in illustrated works on nosology as the real appearances now are to none but our most experienced physicians and medical men. The time of the student will not be wasted in reading long and minute descriptions of that which, after all, is so difficult to describe; but he will be referred to the real thing, or, rather, to that which is next to it—viz., an accurate photograph, capable of being examined microscopically, and so furnishing almost the same advantage as would be conferred by the sight of a suffering patient on the hospital bed. But, beyond this, I conceive that photography may hereafter be pressed into the service of medical science, for the purposes of consultation in cases of danger or difficulty. An accurate photograph of one afflicted with any serious malady could not but be of the utmost value to any skilful physician in forming a judgment of the case, if, from the distance at which the patient might be residing, it should be impossible or inconvenient for him to attend personally, or if the means were not forthcoming to pay the very heavy expenses of a distant country visit; or, perhaps, having once made a visit, a photograph of his patient, forwarded at intervals by the resident medical man, or by some intelligent member of the family, with a written account of the attendant symptoms, would amply suffice, to one well acquainted with the usual course of the disease, to enable him to prescribe accordingly, and thus reserve his time and energies for other sufferers. And this would be no small gain to society at large; for many might, in this economical way, have the advice of the heads of the profession, in any complicated form of disease, who are now deterred by the expense from applying to any other than their own neighbouring practitioner, the very multiplicity of whose avocations may have prevented him from studying sufficiently the especial complaint to the cure of which the physician most usually consulted has devoted the greatest part of his life. In the study of *Comparative Anatomy* also, where the exact relation between the several parts of the skeleton is so necessary to be preserved, the accuracy of the photographic representation cannot fail to be of the highest value. The minute details of the animal frame, so difficult to copy exactly, and requiring scientific skill on the part of the draughtsman, may henceforth be faithfully represented by almost the humblest experimenter in photography; and thus may we hope, that the immortal labours of Hunter, of Cuvier, and of Owen, now locked up in works of formidable dimensions and costly price, may soon be popularised, and brought within the reach of the great body of readers through the instrumentality of the camera, as the cheapest and most effective medium of illustration. In aiding the progress of *Architecture,* the advantages derivable from photography are obvious. Views of existing edifices, remarkable for grandeur of conception, for beauty of execution, or for comprehensiveness of design, may readily be multiplied with the utmost fidelity, and with the most artistic effect. The progress of decay in many of the now crumbling memorials of the genius of a past age will be, so to speak, arrested for a time. The photographer will point his camera at each pinnacled niche, or floriated doorway; he will take his sun-painted sketch of each figured corbel, or grotesque gurgoyle, and, in fact, carry away in his portfolio every nice detail of the architectural design, long before Time, with his destructive hand, shall have had the opportunity to mar any more of the beauty of the original; and when future ages shall be wishing to picture to themselves the appearance of this or that abbey or cathedral, long since crumbled to decay, in all its pristine grandeur, they will thank Providence for the perfection of photography in the middle of the nineteenth century, and will know, at least, how all the most renowned architectural remains looked about that period, when Time had as yet dealt leniently with most of them, and when a love for art, begotten anew by the means of preserving its records photographically, had sprung up with youthlike vigour among the inhabitants of our famed land. Henceforth, there can be no need for bringing, at a heavy cost, sculptured effigies from Italy or Greece, chiselled obelisks from Egypt, or arrow-headed inscriptions from the mounds in the Assyrian plain. A few samples will suffice to give a general idea of the whole treasure stored up, and photographic copies of every object possessing public interest may then easily be procured, by the careful examination of which the entire history of the ruins may be read, and a correct estimate be formed of the value of the whole. At the present moment it would scarcely be saying too much to assert that the pencil of the sun is gradually painting for us a representation of every architectural monument throughout the world, calculated to awaken emotions of pleasure, from its associations with the past, or from its undoubted existing artistic beauty. Our indefatigable countrymen are ascending the Nile; tracing the course of the Zambesi; navigating the Ganges, the Yang-tse-Kiang, the Mississippi; climbing the Alps, the Andes, the Himalayas—in fact, wandering to every region of the habitable globe in search of the beautiful and the picturesque; and sending home, for our inspection, at our quiet firesides, the fruits of their labours in views from all the principal capitals of the world, in scenes memorable for past grandeur or glory—in glimpses of nature unwitnessed before, perhaps, by mortal eye—in sketches of everything that has borne the impress of human genius or skill, whether in the ruins of the sculptured temple, or the mutilated fragment of Runic carving—such as the ancient cross from Kirk Bradden, which I produce in illustration of the remarks I have made. And I think we may venture to affirm, that already a perceptible improvement in the public taste has sprung up from the contemplation of these multiplied proofs of existing or past excellence. Unsightly public buildings are not quite so popular in this country as they were wont to be in the days gone by. We have been rendered so familiar with the striking features of the continental cities, by the aid of photographic sketches, that we are beginning to think, at least, whether it is not possible to add to the architectural beauty of our own. We are gradually training ourselves to inquire whether we cannot blend the artistic with the useful in our plans for public institutions. The capitalist, who is about to build a villa, or to lay out a new street, is beginning to think of the figure it will cut when photographed and exhibited, for letting or for sale, in the auctioneer's window; and he is perhaps induced by this consideration to employ an architect, and bargain for a little display of ornamental skill, instead of confining himself, as heretofore, to the four solid square walls, the inevitable row of ugly chimneys, the mathematically parallel doors and windows, and the circular grassplot to pattern. But independent of the gradual improvement of the public taste in architectural matters—traceable, as I apprehend, very largely to the multiplied copies of artistic excellence produced of late by photographic agency—the architect may fairly look to the camera as one of the most useful adjuncts to assist him in the performance of his useful labours. By it he may, at little expense or trouble, enlarge or diminish his plans without the aid of scale or compass. He may ascertain, if at a distance from the scene of operations, how the work of building is gradually progressing under the charge of a clerk of the works. Nay, if the necessity of taking down and rebuilding the same edifice should exist, he may (as was lately done in America) number every stone and brick, and then photograph the building so numbered, and erect it again from the photographed plan precisely as it was originally constructed. But I must pass on to other applications of the photographic art: civil engineering, mining works, and military operations generally, have been largely indebted already—and will, I venture to predict, be still more so—to the assistance of the camera. The drawing of plans for railways, bridges, and roadways, must obviously be greatly facilitated by correct sketches of the localities through or over which they are designed to pass. I am informed, on good authority, that during the construction of the Great Trunk Railway of Canada, it has been a matter of great advantage that the chief engineers in this country should have been able, so to speak, personally to superintend the work almost without leaving this country, by the inspection of carefully executed photographic plans, as it has been gradually approaching completion. And we are all familiar with the beautiful views of the Great Eastern, taken during her various stages of advancement by the aid of the camera, by which we can gradually trace her emerging from the giant carcase of iron ribs to the beautiful symmetry and perfection of her complete design. To illustrate the use of photography in this branch of science, I exhibit a view of the Great Raxey water-wheel, in the Isle of Man; by a brief examination of which, any unpractical man would, by a few words of explanation, gain as complete an acquaintance with this masterpiece of mechanism, as by the inspection of the actual wheel itself. In mining works, it is sometimes of the utmost importance to convey to the body of directors the gradual progress of the erection of machinery, or a correct view of the appearance of a particular lode, or perhaps even a sketch of the position of the mine itself; and here again photography comes to the rescue, and furnishes a representation which may be depended upon for its fidelity, as conveying neither more nor less than the absolute state of things would warrant.

[In consequence of the pressure on our space, we are compelled to defer the conclusion of this paper and the report of the further proceedings at the meeting until next week.]

Photographic Notes and Queries.

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NATURAL COLOURS IN PHOTOGRAPHY.

Sir,—I have no desire to crush the hopes of those who are looking forward to the day when we shall be able to take photographic pictures in their natural colours, but the foundations of those hopes must rest on the fact of our being in possession of a substance capable of assuming all the myriad colours of nature by the action of light. Do we yet know of any such substances? Most bodies with which we are acquainted are coloured by the same hue throughout, although its tones may vary infinitely; but think what a marvellous product that must be, which shall reproduce all the various tints of a Crystal Palace flower-show, in their right places, too, and with proper intensity! Until some such substance presents itself, to what can we look for the power of producing photographs in the colours of nature? Once, in experimenting with the daguerreotype, I obtained all the colours of the prismatic spectrum on the silvered plate, but in the form of bands or rings; they were evidently the result of galvanic action; but, although I tried repeatedly to reproduce these coloured rings, which, I concluded were the same as Nobili's, I could never succeed under the same conditions and circumstances as those by which the one I accidentally obtained was produced. Frequently, both in the daguerreotype plate and in positive proofs with chloride of silver, I have seen patches of colour—red, green, and blue—which sometimes fell in their right places, as on tiles, trees, and sky, but I only regarded them as accidentals, and due to some vagrant condition of the iodide and chloride of silver. If your readers would communicate their experience in this matter, the solution of the question of natural colours in photography might be hastened.—Yours, &c., Charles Martel.

[M. Ed. Becquerel, by modifying, under certain circumstances, the chloride of silver formed on the surface of a metallic plate, succeeded in obtaining coloured images of the solar spectrum; but he knew of no means by which they could be permanently fixed.]

RE-DEVELOPED POSITIVES.

Sir,—I find that many of my re-developed positives are gradually fading away, and I suppose from this that decay is inherent to the process. If such be the case, photographers ought to know it, for re-developing is very much in vogue at present. I shall be glad to learn from other photographers if they have met with this undesirable result in re-developed positives. Putney.

Sir,—I have a likeness on glass which has been broken. Can the glass be removed, leaving the likeness upon the background, which, in places, is completely detached from the glass?

I. V. N. B.

MEETINGS OF PHOTOGRAPHIC SOCIETIES.

Monday,	May	21—Blackheath Photographic Society.
Friday,	,,	25—Photographic Society of Ireland.
Tuesday,	,,	29—Birmingham Photographic Society.
Wednesday,	,,	30—North London Photographic Society.
Friday,	June	1—Norwich Photographic Society.
Tuesday,	,,	5—London Photographic Society.
Thursday,	,,	7—Belfast Photographic Society.
Wednesday,	,,	13—Chorlton Photographic Society.
Monday,	,,	18—Blackheath Photographic Society.
Thursday,	,,	21—South London Photographic Anniversary.

TO CORRESPONDENTS.

Positive.—1. The cause of the dark spots under the nose and chin is absence of reflected light. Place your sitter on a light-coloured cloth or ground, that may reflect the light upwards. Portraits taken in the open air are generally deficient in chiar-oscuro. 2. In taking the family portraits, to retain the relative size of the sitters, the camera and objects must remain unchanged in position. If you wish to get the images all of the same height, you must place the camera nearer to the smaller ones. 3. A good varnish for positives is obtained by thinning Brunswick black with turpentine or benzine. 4. The lens should be level with the eyes of the sitter, or between the eyes and mouth.

A Novice.—We are at a loss to understand upon what principle you added nitrate of potass and acetate of ammonia to your silver bath. You can try the effects of a drop or two of nitric acid, and if that does not restore it to working order, you must convert it into chloride of silver, by adding solution of common salt, so long as a curdy precipitate falls. The refiners will buy this chloride.

A Subscriber from the First.—The quantity of antimony is probably too small to interfere with the results. You can obtain pure silver from the chloride, by mixing it with 70 parts of chalk, or whiting, and 4 parts of charcoal to every 100 parts of chloride. Put the mixture into a clay crucible, and expose to a red heat for half an hour, at least. Allow it to become quite cold, then break the crucible. Pure silver will be found at the bottom.

A Beginner.—Better seek the advice of some practical photographer before you spend your money, else you run the risk of buying what you do not require, and omitting other things that are indispensable. As you cannot have pictures until you have learned how to print, better begin with printing, and so get your hand in. Taking a negative is *not* a very simple affair.

Old Bath.—Evaporate the solution nearly to crystallisation, then add saturated solution of cyanide of potassium, until the mixture exhibits a decidedly alkaline reaction. Evaporate it to dryness, and introduce the pulverulent mass into a crucible or melting-pot. An exposure to a full red heat for ten minutes is sufficient to reduce the silver to the metallic state.

A Reader and Photographer suggests that when a new formula or process is proposed by any one, a specimen of its capabilities should be sent to the Editor of the "Photographic News," in order that he might be able to spare readers the trouble and loss attendant upon trying useless novelties.

A. S. W.—Chloride of ammonium, 2 ounces; water, 1 pint; albumen, 1 pint; solution of ammonia, 2 drachms. Float, and remove the paper quickly; sensitise in bath composed of fused nitrate of silver, 1 ounce; distilled water, 8 ounces.

Amelia.—Buy a pound of chloride of lime, keep it in a covered jar; when your work is done, dip your wetted fingers into it, and rub them well on the palms of your hands; the stains will soon disappear.

Stereoscopic Exchange Club.—Mr. H. Bath, Swansea, has intimated his wish that his name should be withdrawn from the Stereoscopic Exchange Club.

Hopeful.—We can only *suggest* that it should be exposed to the vapour of mercury, carefully watching the action; but as we have not tried its effect we do not recommend it, without previous experiment.

Query.—Such an advertisement carries fraud on the face of it. Do not be too credulous; advertisers are seldom so disinterested as to give away what they could turn to profitable account themselves.

Alfred.—It appears you have entered upon the *practice* of photography without any preliminary study, and of course you will meet with difficulty and disappointment at every step.

Geo. F. E. Hawke.—The yellow stain is produced by the gold solution. The print is rather too sharp, and was not taken at the best part of the day. The parts in shadow are confused, from want of relief.

Manfred.—They come, very properly, under the influence of Lord Campbell's Act, and you should give information to the inspector of police of your division.

W. W.—You do not state the size of your portrait lens; consequently, we cannot answer your question.

S. S.—Fifty-four grains of chloride of ammonium contain as much chlorine as one hundred and four grains of chloride of barium.

Hypo.—You may possibly restore the proof, if it be not too far gone, by immersing it in the gold-toning bath.

Argus.—The explanation is quite unintelligible; it is a good mode of sheltering oneself from the consequences of ignorance.

Tartan.—You will obtain the knowledge you require from Mr. Lake Price's articles on *Chiar-oscuro*, now in course of publication in this journal.

Pyro.—You can obtain French collodion, both plain and iodised, of several dealers in photographic materials.

H. A. R.—The subject has been investigated and explained by Mr. Goddard, the optician.

B. J.—The stains are hyposulphite of silver, due to careless manipulation. Do you wash the prints before putting them into the toning-bath? If not, do so.

J. Carey.—If you want a good negative, you must use negative collodion.

Communications received from Mr. W. W. Hughes.—Mr. Archer.—J. L.—A Constant Subscriber.—B. B.—E. C.—Thos. Collins.—Persevere and Prosper.

The "Amateur Mechanic," and several other communications, are in type.

⁂ All editorial communications should be addressed to Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard, London, E.C.

THE PHOTOGRAPHIC NEWS.

Vol. IV., No. 90.—*May* 25, 1860.

ON COMPOSITION AND CHIAR-OSCURO.—XV.

BY MR. LAKE PRICE.

"The most learned arrangements of light and shade may astonish; but there is a charm in the chiar-oscuro of Nature which carries irresistible sway."—Burnet.

One of the greatest advantages possessed by photography is its power of delineating the *homogeneous* light and shade seen on subjects of so intricate a nature that, without its assistance, the artist heretofore could, in sketching them, have only *approximated*—more or less, according to his abilities—to the reality of the confused chiar-oscuro seen on large assemblages of people, on the elaborate traceries of Gothic edifices, or on any similar subject; in which, on the one hand, the living actors were moving, changing, or dispersing, or on the other, the time requisite for the delineation was necessarily so prolonged, that the alternations of light and shade on the intricate architecture were so great as entirely to *reverse* toward evening the effect with which the painter had commenced his study in the morning. Photography overcomes with the utmost facility these difficulties; by its powers the most bewildering chaos of irregular masses, in the general view over a great city, is rendered at once, with a *unity of chiar-oscuro* quite unattainable by any other means. In taking a sort of short-hand memorandum of a vast assemblage of persons, or of a moving ceremonial, the hasty sketch of a painter is a hieroglyphic, the intention of which he alone can comprehend; but the photograph is capable of giving, by an exposure of *one second*, or even less, the varied incidents; of unravelling the apparently hopeless tangle; nay, of actually individualising the actors in the passing scene, and fixing their effigies and movements as they appeared.*

In all subjects whose principal interest consists of effects of light and colour combined, as sunsets, &c., the imaginative feeling and sentiment of the painter's touch is unapproachable by photographic representation. It is, therefore, most desirable that the student should early appreciate the class of subjects and objects which may be attempted with the greatest probabilities of success with the camera, and thus save himself much disappointment; although even those which are incapable of being rendered in a *complete* form will possess *portions* of much value. The desirable thing for the student who is anxious to add subjects of real interest to his folios, is to eschew the mere mechanical of "clean plates," which, in the present advanced state of photography, should give him little anxiety if he is sufficiently careful in the processes, and having selected a *modus operandi* which appears to give satisfactory results in the particular direction he wishes to undertake, to avoid the confusing influence of the multitudinous "NEW PROCESSES," most of which are, necessarily, destined to be abortive, but his dabbling in which serves to bewilder him and prevent his giving that clear and vigorous attention to the *artistic selection and arrangement of his picture*, which a perfect command and reliant confidence in a familiar manipulation creates. By a moderate attention to the principles of composition and chiar-oscuro he will be saved from selecting subjects which are anti-artistic in their nature, whilst the difference often of only a very few yards in the placing of the camera will at once alter the whole arrangement, including certain objects in the foreground which shall balance the composition, or excluding forms which may give erroneous qualities of line or chiar-oscuro in his picture. Photography, under these conditions, is capable of more than is generally imagined. Studies of the peasant figures of Italy, of sufficient size, have been drawn by Nature's pencil in the camera with a perfection which the pencil of Leopold Robert or Horace Vernet could not excel. Animals are delineated in a manner which shows that even our first painters might see new beauties in Nature as represented by herself, whilst the ever-varying clouds, or the ocean in its changeful moods of calm or storm, is at once fixed on the photographic tablet with its varied drawing now correctly accentuated, its reflexions or sparkling waves more truly depicted than any artist, except those of the highest talent, could emulate. Irrespective of *mere size*, these are amongst the more artistic applications of photography; the mere mechanical, although in many instances of great utility, is comparatively uninteresting and unintellectual, and soon ceases to fix the attention of the beholder; but the utmost possible repetition of the ever-varying *effects* to be seen in Nature never palls on the senses; nay, to the art-cultivated mind, "appetite grows by what it feeds on," and the thorough appreciation of the beautiful creates that which has been aptly defined by an author who has written on our nation as "ce principle de moralisation qui, procédant du sentiment du beau et de l'amour des arts, doit modérer l'exces des appétits brutaux;"* the masses of our population have, by the powers of photography, beheld representations realised of almost every subject which can interest or instruct them.

In laying before the student the more obvious principles of composition and chiar-oscuro, the writer must also notice that there are subtilties of art which are beyond mere verbal description, and which "grow with the growth" of a picture, as with each touch the painter realises his previous conceptions, and which, varying with the idiosyncracy of the individual artist, enables us at once to recognise his productions.

In conclusion, no better advice can be given to the student than that of Sir Joshua Reynolds, who says:—

"The great use of studying our predecessors is to open the mind, to shorten our labour, and to give us the result of the selection made by those great minds of what is grand or beautiful in Nature: her rich stores are all spread out before us; but it is an art, and no easy art, to know how or what to choose, and how to obtain and secure the object of our choice. Thus, the highest beauty of form must be taken from Nature: but it is an art of long deduction and experience to know how to find it. We must not content ourselves with merely admiring and relishing; we must enter into the principles on which the work is wrought. These do not swim on the superficies, and consequently are not open to superficial observers.

"Art in its perfection is not ostentatious; it lies hid, and works its effect, itself unseen. It is the proper study and labour of an artist to uncover and find out the latent cause of conspicuous beauties, and from thence form principles for his own conduct. Such an examination is a continual exertion of the mind, as great, perhaps, as that of the artist whose works he is studying. The sagacious imitator does not content himself with merely remarking what distinguishes the different manner or genius of each master; he enters into the contrivance in the composition, how the masses of lights are disposed, the means by which the effect is produced, how artfully some parts are lost in the ground, others boldly relieved, and how all these are mutually altered and interchanged, according to the reason and scheme of the work. He admires not the harmony of the colouring alone, but examines by what artifice one colour is a foil to its neighbour. He looks close into the tints, examines of what colours they are composed, till he has formed clear and distinct ideas, and has learned to see in what harmony and good colouring consist. What is learned in this manner from the works of others becomes really our own, sinks deep, and is never forgotten; nay, it is by seizing on this clue that we proceed forward, and get further and further in enlarging the principles and improving the practice of our art."

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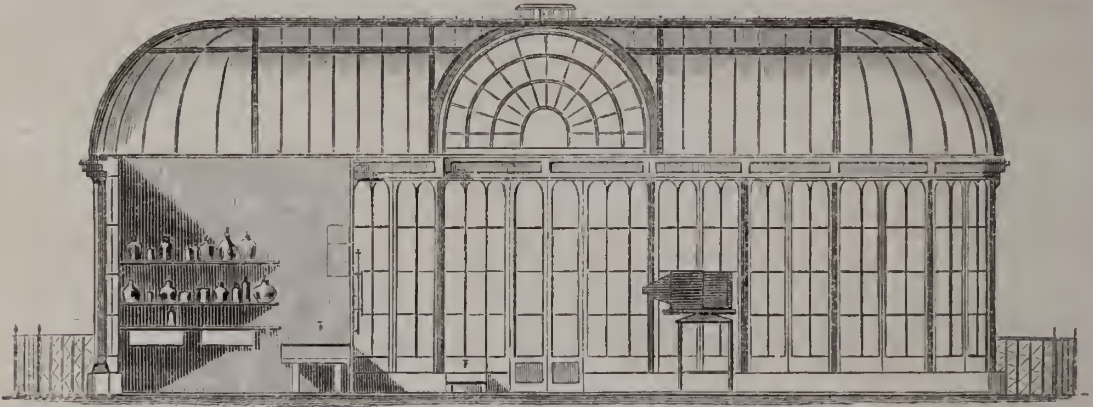
* On a plate 12 by 10 inches, an exposure of less than a second sufficed to give the *perfect* representations of Her Majesty and the Prince Consort, with the Court and Staff, and some 15,000 spectators, at a review at Aldershott; any individual included in the field of view being perfectly recognisable.

* Les Anglais chez eux. Francis Wey.



Section of the Upper Floor of the Photographic Building of the Ordnance Survey Department

PHOTOGRAPHY AND ITS APPLICATIONS.*

The operations for the production of the print or positive proof are:—

1. Salting and albumenising the paper.
2. Making the paper sensitive.
3. Printing.
4. Toning and fixing.
5. Washing the prints.

1. *Salting and Albumenising.*—The paper is floated on the solution for one minute and a half, and hung up to dry:—

The whites of six eggs	6 ounces.
Distilled water	6 ,,
Chloride of ammonium	2 drachms.

When the ingredients are mixed, take a bundle of quills or a fork, and beat the whole into a perfect froth. As the froth forms, it is to be skimmed off, and placed in a flat dish to subside. When the froth has partially subsided, transfer it to a tall, narrow jar, and allow it to stand for several hours, that the membraneous shreds may settle to the bottom. Then pour off the upper clear portion, which is fit for use.

2. *Making the Paper Sensitive.*—This operation is carried on in the dark room.

NITRATE BATH FOR PAPER.

Nitrate of silver	1 ounce.
Distilled water	7 ounces.

The paper is floated on this solution for five minutes, and then removed and dried.

3. *Printing.*—The negative is placed in a printing frame, in contact with a piece of sensitive paper, and exposed to the light. The exposure is continued until the detail is sufficiently clearly seen, allowing for the reducing power of the toning bath.

If the negative is a good one, the print will be of an intense chocolate colour, whilst the ground of the print will be hardly tinged; and, after toning, the ground will be white, and the print a jet black.

4. *Toning and Fixing the Prints.*

TONING AND FIXING BATH.

Distilled water	1 pint.
Sel d'or (hyposulphite of gold and soda) ...	40 grains.

Dissolve.

Hyposulphite of soda	1 pound.
Water	1 pint.

Dissolve.

Pour the solution of *sel d'or* gradually into the solution of hyposulphite of soda, stirring the latter meanwhile with a glass rod. Let it stand twelve hours before using.

The detail of the proof, as before observed, should, in the toning bath, become of a jet black, and when this stage has been attained the proof should be removed. Experience is the best guide in performing these operations—fixed rules can hardly be laid down for them; for if the printing be carried on for a considerable time to bring out details which, having been in an unfavourable colour on the plan, have not photographed clearly, it will be at the expense of the general whiteness of the ground of the print; if, on the other hand, the printing be stopped early, in order to preserve the ground of the negative, it is probable that some of the detail will not be sufficiently printed; and the same remarks apply to the toning.

Judgment must be exercised so as to carry each process to that extent by which the best general result will be secured.

5. *Washing the Prints.*—It is very important that the proofs should be washed so thoroughly as to leave in the paper no traces of hyposulphite of soda. A very minute proportion of this salt is sufficient to cause the proof to fade in a short time.

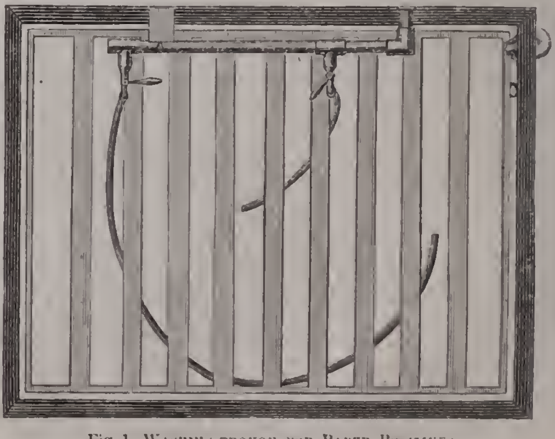


Fig. 1. Washing-trough for Paper Positives.

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* Continued from vol. iv. p. 26

The proofs are placed in a trough of water, through which a stream is constantly flowing from two pipes (see fig. 1). The mouth of one of the pipes is at the bottom of the trough, and that of the other half way between the bottom and top. Both pipes are curved, so that a rotary motion is given to the whole body of water. A waste-pipe at the top, and another at the bottom, carry off the surplus water as fast as it flows in. The prints are left in the washing trough from six to eight hours.

In order that the proofs may be dispersed throughout the body of the water in the trough, instead of floating at the top, the trough is divided horizontally into three compartments by movable wooden trays. As soon as a certain number of proofs have been placed in the trough, one of the trays is placed on the top of them, and the whole are forced down to the lowest compartment of the trough. The next supply is treated in like manner, and the remainder are allowed to float on the top. The trays are made of battens, nailed to a wooden frame at intervals of an inch apart, and the frame is loaded with lead.

(*To be continued.*)

PHOTOGRAPHIC GOSSIP.

If recent occurrences had not shown us that it was not altogether advisable to give unqualified credence to what is doing in photographic matters by our cousins over the Atlantic, we should be inclined to say, that one of the greatest advances towards the photographic representation of colour which has been hit upon, since the memorable experiments of Herschel, Talbot, and Becquerel, has just been achieved by an experimentalist, whose name may not be altogether unknown to the readers of "The Photographic News"—Mr. B. M. Brackenridge. The results which he has obtained are certainly very curious, and, without pledging ourselves to their accuracy, we think our own experimentalists should lose no time in following up the track which he has pointed out. The method of proceeding is very simple:—A piece of paper is taken which has been coated with gelatin, salted with a 15 grain solution of chloride of ammonium, and sensitised with a 40 grain solution of nitrate of silver; it is then allowed to dry, and, up to this stage, the formulæ and manipulations are in nowise different from those adopted in the ordinary positive printing process. When dry, the sensitised side of the paper is floated upon a solution of nitro-prusside of sodium (the strength of which seems to be almost immaterial), and it is then allowed to dry spontaneously, and may be preserved for use. A sheet of paper, prepared as above, was exposed to light in a pressure-frame under a piece of paper, having a design painted upon it in water colours. When taken from the frame (we are not told the length of exposure), the sensitive paper seemed scarcely to be acted upon in the least, and Mr. Brackenridge was about to throw it aside, when, on holding it up before the light, he was astonished to see that it gave a transparent *coloured image*, the reds being very strong and bright, the blues, greens, &c., though not quite so strong, being very distinct; the whole, in fact, forming, when held before a strong light, a beautiful coloured transparency. We have not yet been favoured with any further particulars respecting the method of fixing these colours, although, as they are obtained on paper, we should hardly think that the fixing of them would present such insuperable difficulties as M. Becquerel has met with in the attempts to fix his heliochromes. Nitro-prusside of sodium is at present a difficultly-obtainable salt, not, however, on account of the trouble or expense attending its manufacture, so much as owing to its not having been as yet put to any particular use in the arts. It is prepared by acting on ferrocyanide of sodium with nitric acid. We shall give our readers full details respecting its mode of preparation and purification in our Dictionary. We are expecting shortly to receive a fuller account of these experiments, as we understand that Mr. Brackenridge has met with some very remarkable results when employing, as a negative, paper prepared with colours of similar hue, but differing in chemical composition. Vermilion, carmine, and some other colours of the same red character were copied; and, long before any action was perceptible under the transparent carmine, the other red colours were properly rendered, with the exception of the vermilion, which, in all cases, was represented by a most brilliant *chrome-yellow* tint. As soon as any further particulars are given to us, we shall not fail to communicate them at once; meantime, we hope that some of our readers may be induced to try these experiments, and verify their accuracy.

ON THE ACTION OF LIGHT.

M. Thenard has communicated the following experiment:—

1. In the darkness of night he desolarised a sheet of writing paper by exposing to steam for upwards of an hour.

2. Dividing the paper into two portions, one was put into a portfolio to serve as a test; the other was rolled up, and placed in a glass tube, at one end of which ozonised oxygen passed in. At the expiration of a quarter of an hour, the ozonised oxygen was clearly perceptible at the other extremity of the tube. The paper was then withdrawn.

3. This piece of paper being afterwards employed in the same manner as the solarised papers of M. Niepce de Saint Victor, produced exactly the same results; the other half of the sheet of paper, which had been kept as a test, produced no effects.

4. Paper prepared with chloride or nitrate of silver, treated with ozone, on the contrary, gave no apparent result.

5. Ordinary ozonised paper, however, possessed all the other properties of solarised paper.

6. An ozonised paper, kept for some time in a test tube, disengaged an odour which was not that of ozone, but of an essential matter; it was, however, very combustible.

What must we conclude from these facts? Nothing less, than that the phenomena of solarisation described by M. Niepce are chemical phenomena, indirectly determined by the agency of light, which, in this instance, acts only as an intermediate agent.

ON THE TINCTORIAL PROPERTIES OF ALBUMEN.

BY M. GUIGNET.

The following results were obtained upon a cotton fabric printed with albumen and steamed, in order to coagulate the albumen:—

In the albumenised parts the cotton receives certain dyes, which wool and silk do not. Picric acid tinges it yellow; fuchsine tints it red, &c.

This property of albumen has been known and applied for a long time in calico-printing. I have observed certain facts which reveal new tinctorial properties in albumen, which will, doubtless, be turned to account in the industrial arts.

A fabric printed with albumen is soon moistened in pure water; but the water penetrates the albumenised parts very slowly.

If a liquid, insoluble in water, be added to the water and stirred briskly, this liquid will go only to the albumenised parts and tinge them, if it contains a suitable colouring matter. For example, water and a fat oil holding alkanet in solution; water and crude aniline (which tinges albumen brown), &c. Aqueous solution of iodine tinges albumen yellow. In contact with water holding starch in suspension, this yellow tint becomes green, then blue, and disappears entirely. The iodine leaves the albumen and goes to the starch, and the blue becomes imperceptible in the mass.

Neutral chromate of potassa gives no tinge to albumen; but the bichromate, or a diluted solution of chromic acid, tinges it yellow.

Albumen also assumes a vivid citron yellow colour in a solution of acetate of lead; red in a strong solution of nitrate of silver; black in a bath of logwood.

Permanganate of potassa tinges albumen brown, without tingeing the non-albumenised parts.

Albumen is tinged pale yellow-brown in a boiling solution of a salt of the peroxide of iron. Prepared in this manner, it assumes a *blue* colour with ferrid-cyanide of potassium; *violet* with decoction of madder; *black* with logwood, &c.

In a solution of sulphate of copper, albumen acquires no tinge; but it is coloured blue in a solution of ammoniacal sulphate of copper. By the action of alkalis, this blue tint becomes a very brilliant violet-lilac. With ferrid-cyanide of potassium, the marron-red tint of ferrid-cyanide of copper is obtained. Ammoniacal solution of cobalt also tinges albumen.

The salts of gold, platinum, and palladium, also tinge albumen yellow without attacking the non-albumenised tissue. Albumen tinged with chloride of gold becomes of a deep violet, almost black with protochloride of tin or protosulphate of iron. Albumen tinged with chloride of platinum is coloured a vivid yellow-brown with protochloride of tin.

Finally, as might have been expected, albumen printed upon cotton also fixes bichloride of mercury, and assumes the scarlet hue of bin-iodide of mercury when treated with a very dilute solution of iodide of potassium.

The Photographic Tourist.

A TOUR IN THE DEPARTMENT OF AIN, FRANCE.

We have been favoured with the following communication from Mr. W. W. Hughes, dated Nantua (Ain), May 14th, 1860:—

Last June I proposed giving you a sketch of a tour through this part of France, which you were kind enough to say you would accept. I was unfortunately, then, prevented from doing so, until too late in the season. I now, however, send it, as it may possibly be acceptable to some of your readers. I must first tell you that the country around Nantua is as yet to Englishmen a *terra incognita*, lying, as it does, completely out of the line of the general tourists, and is, perhaps, the most picturesque district in France—full of grand mountain, lake, and forest scenery. The journey I beg leave to lay before you is as follows:—

From Paris to Bourg-en-Bresse direct, by the Lyons Railway. Remain one day, at least, at Bourg, where many excellent groups, especially of a market day, may be obtained of the curious and peculiar costume of the Bresse peasantry. The Eglise de Brou contains the superb monuments of the Dukes of Savoy. The entire building is replete with objects of great beauty and interest. From Bourg to Pont d'Ain, thence, by diligence, to Mantua, over the magnificent pass of Cerolon. There are two good and reasonable hotels at Nantua—Du Nord, close to the lake, and l'Ecu; or furnished lodgings may easily be obtained. Here I leave the photographic tourist for a time, as there is quite sufficient to employ his time in the town, and close around it, for a good while. I refrain from entering into any description of the town and lake, as I would not willingly cause disappointment, though I believe that would be scarcely possible.

I now proceed, taking Nantua as a centre, to lay out two or three days' excursion in the vicinity.

First Day.—Nantua to Izernore, &c., by La Clare; and here let me inform you that a horse and carriage, such as they are, in this mountain country, can always be had for five francs a-day, if you drive yourself, or seven if a man goes with you, in which case he finds himself and horse in eatables; but it is, of course, necessary to make your bargain before starting, or it will probably cost you ten francs, or more. The Churchyard of Izernore, although not a lively subject, is still a good one for the camera. Two hundred yards from it are the still considerable remains of the Roman Temple of Minerva — three of the columns in excellent preservation. A quarter of a mile from this is the ancient bridge of Heznat, crossing the river Oignin (most beautiful). Half a mile down the stream are two remarkably picturesque cascades, a little difficult of access, I must own, but that is of small import to an enthusiastic artist. These falls must be inquired for at Izernore, as they are scarcely known to the natives of Nantua, who—as is so often the case with persons who pass their lives in the midst of the most lovely scenery—know little and care less about it. From Izernore to Iamogniat, close to which village are the beautiful falls called the Sant de Charmine. The Oignin is here about 60 yards in width, when full, and is precipitated by three falls from the height of about 156 to 200 feet. Unfortunately, in consequence of a bend of the valley, only two falls can be seen at the same time. It is well wooded, and the rocks superb.

Iamogniat to Matafelon. The Pass of Matafelon is very fine, together with the view of the suspension-bridge of Thoirette, over the Ain, should there be time, and there is no reason why there should not be (as I have done it easily myself, taking views of the principal objects). A rather fatiguing walk to those who are not well used to mountain roads will be well repaid by a visit to the Château de Coiselet, the ancient seat of the Counts of Thoire and Villars, situated at the junction of the Oignin and the Ain. The whole of this trip, allowing time for working the camera, may, without difficulty, be accomplished in one day, provided the tourist leaves Nantua in good time—say not later than 7 A.M.

Second Day.—Nantua to Mezriat, by Vort. In the village of Vort, at the foot of the Lake of Nantua, two or three views of a peculiarly rustic character may be obtained; in fact, in this, and the almost adjoining one of Brion, where there are the remains of what was once a noble old castle (built, in 1240, by Etienne, the second Count of Thoire and Villars, to keep in check the abbots of Nantua), may be found the most perfect types of the ancient French mountain villages. St. Martin du Fresne Church, and round tower of the Castle; thence to the Pass of Mezriat, about two miles in length, through a narrow and deep gorge of the mountains, abounding in magnificent rock and forest scenery; at the end of the Pass, the extensive ruins of the Abbey of Mezriat. N.B. A first-rate bottle of wine can always be had at the little *auberge* close to the ruins—ask for the *Vin Rouge Cacheté.*

Third Day.—Nantua to the signal on Mont d'Ain, rising 3,600 feet immediately above the town. The road through the forest, for two-thirds of the ascent, is very good, with fine views of the town and lakes of Nantua and Izlant, together with the Jura range and the Cré de Chalains, at different openings in the forest. About half way up is a very ancient and curious little chapel of the Sainte Vierge de Mont d'Ain; the last part of the way requires a good head and a guide, but a boy can be obtained in Nantua thankful to show the way for a couple of francs a day, or less. From the summit the tourist will be (should he be fortunate enough to have a clear day, and the contrary is the exception here) delighted with the superb view of Mont Blanc, and the whole range of the Upper Alps, including the Diablerets at the head of the Lake of Geneva, the Dents de Midi, Mont Creolo, and the Upper Juras. I have seen Mont Blanc from almost every point of view, but, in my opinion, that to be obtained from the signal of Mont d'Ain is incomparably the most magnificent. From the same spot, towards the west, can be seen Lyons, nearly the whole of Bresse, and the immense plain stretching away to the Cevennes, which form a fine, though distant, background. It would be well this day to return to Nantua by Mont Chamoise.

Now, sir, as I fear I have encroached too much upon your valuable time, and have no wish to write a topographical account of the department of the Ain, I will merely mention that the Val de Cheserg, the Falls of Chavix, the Bief de Laudeyron, Negrolles, &c., all in this immediate neighbourhood, are well worth visiting, and will proceed forthwith to get the photographic tourist started on his way home, in the best manner in my power. Should he wish for a trip to Geneva, he can be there in four hours, *viâ* Bellegarde; or, if he has time, I should advise him to go up by Coilliard to the Grand Abergement, and thence down the Valromez (the scenery of which is unrivalled), till he meets the Lyons and Geneva Railway, thence to Amberieu, stopping, if possible, two or three hours at St. Rambert. From Amberieu, by omnibus, to Lagnieu, and, crossing the Rhone, go to the Grotte de la Balme, which should on no account be missed, at which point I beg leave to make my *congé* as a guide, and say farewell, wishing him a pleasant journey home, and success with his plates, be they wet or dry.

A Catechism of Chemistry.

CHEMICAL AFFINITY—(*continued*).

Q. Can the same substance exist in the solid, liquid, and gaseous state?

A. Yes. Water is a familiar example of this. At a low temperature it is a hard, transparent, brittle solid; at the ordinary temperature of the atmosphere it is a liquid; and at a higher temperature it is an invisible, colourless gas.

Q. Does water alter in weight when it assumes these different conditions?

A. It does not. The weight of any substance never varies, an ounce of water is attracted towards the earth with exactly the same force, whether it is in the solid, liquid, or gaseous state, whether it be ice, water, or steam; it only varies in bulk.

Q. Is there any theory respecting the ultimate physical constitution of the different bodies, elementary and otherwise?

A. Yes. What is called the *atomic* theory.

Q. Explain the meaning of this.

A. According to the atomic theory, it is assumed that matter is not infinitely divisible, but that it consists of particles, or *atoms*, which are incapable of subdivision.

Q. What is the size of these ultimate atoms?

A. We have no means of determining what the size of these atoms may be; in fact, it is only by reasoning that we are led to the supposition that the divisibility of matter has its limits; experiment always showing that this minute subdivision may be carried to an extent which transcends our powers of conception.

Q. Give an illustration of this.

A. A single grain of gold may be beaten out into 49 square inches. One square inch of this (= $\frac{1}{49}$th of a grain) may be attached to a piece of glass, and then divided in each direction by means of a diamond point, by lines only the $\frac{1}{10000}$th of an inch apart. Thus, one grain of gold may be cut into 49 × 10,000 × 10,000 = 4,900,000,000 (four thousand nine hundred million) separate fragments, each visible under the microscope. In the gilding of silver wire, and in many cases of chemical solution and precipitation, the subdivision is carried to an even greater extent than this.

Q. Can a compound body be separated into its elementary constituents by any process of subdivision like the above?

A. No; mechanical division has no power over the force of *chemical affinity*; it merely influences the force of cohesion. A lump of salt, consisting of the elements chlorine and sodium, may be ground into the most impalpable powder, but each particle will still remain salt, and, when dissolved in water, the force of cohesion between its particles will be still further overcome; but every drop of the water will contain the salt, unchanged except in physical appearance.

Q. What is due to this force of *cohesion*?

A. Cohesion is the force which holds bodies together in one solid mass, and produces, by its variation in power, tenacity, brittleness, softness, malleability, &c.

Q. What are the characteristic properties of the force of chemical affinity?

A. It is only exerted between dissimilar bodies, and then only when the particles are brought extremely close together. In fact, it is only occasionally that a sufficient approximation between dissimilar particles of bodies can be effected by mechanical means to enable them to act chemically upon each other.

Q. Give an illustration of this.

A. Nitrate of potash, sulphur, and carbon, may be ground together and reduced to the finest possible state of mechanical subdivision (as in the manufacture of gunpowder), and it will still remain a mixture of the three bodies, the separate particles of which might be distinguished under a microscope.

Q. Would it not be possible to grind them so fine that a microscope would be unable to separate the constituents of the powder?

A. Such might be possible even then it would only be necessary to mix the powder with water, which would dissolve out the nitrate of potash, and then to dissolve the sulphur out of the residue with bisulphide of carbon, to show that the mixture was a mechanical and not a chemical one.

Q. How, then, can these bodies be united chemically?

A. The two bodies, sulphur and carbon, have a very intense chemical affinity for one of the constituents of the nitre; but mere mechanical mixing will not suffice to bring the particles sufficiently near for this affinity to exert itself. It is only necessary to apply a lighted match, or a spark, and the sulphur and nitre will be melted by the heat, the particles are thus enabled to approach within the sphere of their chemical attraction, and the whole mass instantly enters into chemical combination; the original black powder disappears, and an immense volume of gaseous matter is produced.

Q. Is chemical affinity exerted with equal force between all bodies of dissimilar nature?

A. No; it varies according to the properties of the bodies. Generally speaking, the greater the difference between two bodies the more intense affinities they have for each other.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 21*st May*, 1860.

Baron Paul Thenard, the son of the late illustrious chemist, has been for some time endeavouring to furnish us with an experimental explanation of those curious phenomena observed by M. Niepce de St. Victor with his insolated tubes. The former *savant* believes these phenomena to be mostly due to ozone, that allotropic condition of oxygen, which has formed the subject of so many interesting papers, recently published by Schoenbein, Phipson, Houzeau, &c. Here are a few experiments M. Paul Thenard has just communicated to the *Société Philomatique*, of Paris, upon the subject:—

In the middle of the night, he desolarised a sheet of common paper, by exposing it for a quarter of an hour to aqueous vapour. By the term desolarised we understand depriving a sheet of paper, which has been solarised, of the power of acting upon photographic paper. M. Niepce has already shown that watery vapour takes away from paper the property of reducing silver salts after it has undergone exposure to the sun's rays. The desolarised sheet was then cut in two: one half was put aside for comparing the results to be obtained upon the other. This second half was rolled up and placed in a glass tube, into one end of which a current of ozonised oxygen was made to pass. In about a quarter of an hour, the odour of ozone being distinctly perceptible at the other end of the tube, the paper was withdrawn, and though prepared thus, in the middle of the night, produced all the effects observed with M. Niepce de St. Victor's insolated tubes. The half sheet that had been put aside, produced no such effect, and had not the slightest action upon photographic paper.

When a paper prepared with chloride or nitrate of silver was exposed to the action of ozone, no sensible effect was obtained. It is certainly not ozone, therefore, which reduces the silver salt on the photographic paper. But, again, ordinary paper which has been ozonised produces all the effects of insolated paper. Finally, M. Thenard observed that ozonised paper, placed for some time in a narrow jar, evolves a peculiar odour which is not that of ozone, but rather of some essential oil; this odour is, however, very feeble.

From these experiments M. Paul Thenard concludes that the reductions observed in M. Niepce's tubes are due to chemical actions, determined indirectly by light.

I remember, some time ago, hearing a conversation between M. Niepce de St. Victor and Dr. Phipson, who had been present at many of the former's experiments, and who attributed their results to ozone from the first:—M. Niepce endeavoured to show that he had discovered some new property of light, which had hitherto remained ignored. Dr. Phipson said the phenomena in the insolated tubes, that is, the reductions of the silver salts on the photographic paper, were due, in the first place, to the formation of ozone, which, acting upon the organic matter inclosed in the tube, produced some such substance as aldehyde or formic acid, which, in its turn, produced the images on the photographic paper.

One of our evening journals gives us the following method of rendering paper impermeable to water, and, in a great measure, incombustible:—

"Two hundred and fifty parts of alum and 125 parts of white soap are dissolved together in about a pint of water. In another vessel, containing about the same quantity of liquid, 60 parts of gum-arabic and 180 of glue are, in their turn, dissolved. The two solutions are mixed, and the whole heated over a fire. The paper is then passed through this bath, and afterwards between two cylinders; it is then dried. The cylinders may be dispensed with by suspending the paper, sheet by sheet, in the air, until the liquid has finished to drop from it, and then drying it."

At the last meeting of the Academy of Sciences, M. Chevreul presented an immense manuscript work, forming the continuation of his indefatigable researches on the science of colours and dyeing. "The work which I have the honour of laying before the Academy," says the illustrious author, "is the result of researches undertaken to discover *a means of defining and naming colours by a precise and experimental method.*" M. Chevreul has been occupied, more or less, with this subject since the year 1843; a portion of his labours in this important branch of chemical art has already appeared in the English language.

M. Boussingault has discovered small quantities of nitrates in different varieties of guano. There is nothing extraordinary in this, since Liebig and others have long since shown that ammonia in organic matter is slowly oxidised into nitric acid by the oxygen of the atmosphere. Berzelius formerly observed that ammonia, in contact with peroxide of lead, was completely acidified, its nitrogen being transformed into nitric acid.

About a fortnight ago M. Deville read a paper upon the presence of nitric acid in the natural specimens of peroxide of manganese. Some manganese from Giessen, when heated, evolved a considerable quantity of water, which was found to contain nitric acid. Ever since the time of Schéele and Priestley—to whom the discovery of oxygen is due—it has been remarked that this gas, when prepared from peroxide of manganese, contains a certain proportion of nitrogen; and Berzelius noticed in it an odour of nitrous acid. M. Boussingault, and not M. Deville, was the first to show, experimentally, that natural peroxide of manganese often contained nitric acid. From the small quantities of this acid present in the mineral, M. Deville concludes, I think, rather rashly, that "peroxide of manganese may have been derived, in nature, from the nitrate of that metal. But, as it is known that porous bodies—like the oxide in question, oxide of iron, peat, charcoal, &c.—condense ammonia, and determine its oxidation into nitric acid, it is more probable that the slight quantities of nitric acid discovered in natural samples of manganese are derived from condensed ammonia."

Professor Nicklès, of Nancy, has just published a note upon the isomorphism of bismuth with antimony and arsenic. The iodide of bismuth $BiIo_3$ which he has obtained directly (by the action of vapour of iodine on bismuth) in a crystallised state, possesses the same crystalline form as iodide of antimony and iodide of arsenic (very short hexagonal prisms, in form of six-sided tables). These three iodides present all the characters which entitle us to denote them isomorphous bodies; moreover, their metals all crystallise in rhombohedrons.

It is with much regret I announce to you the death of M. Henry Robiquet, who was already known to the photographic and to the chemical world, as the author of many interesting papers. I believe that the well-known chemist Robiquet was the father of this young man, cut off from science and the world at a moment when he had just attained the chair of physics, at the Parisian School of Pharmacy. M. Henry Robiquet was generally loved and esteemed by all who knew him; his pharmacy, at Paris, was one of the largest and most renowned of the capital, but the attention he was obliged to pay to it drew him away sadly from those purely scientific studies for which he had so much taste. He died of a calculus in the liver, after two days' illness only.

You will be glad to hear that, on the demand of the Minister of Public Instruction, M. Duméril, of the Institute, and M. Lordat, professor of medicine at Montpellier, two of our most venerable and renowned *savants*, have been promoted, by the Emperor, to the rank of commanders in the Legion of Honour.

DRY PROCESS.

To the Editor of the "PHOTOGRAPHIC NEWS."

SIR,—As the convenience of a reliable dry process for landscape photography is so unquestionable—in spite of the arguments to the contrary of those who prefer turning enjoyment into toil, by carrying a small donkey-load of chemicals and apparatus—I ask the admission of this, if you think it worthy the space, and the subject not already exhausted with the host of processes—original, borrowed, or modified—that have from time to time appeared in your pages. It is a modification of Fothergill's, which will be found as certain and satisfactory as can be desired—save many a spoiled plate, and much ruffled temper. It is simple to work, requiring only that amount of care the manipulation of all dry processes calls for.

That the original process is uncertain many have found to their cost. That the mode by fully washing—so well described in some of your late numbers—has the same grave drawback, I have too good cause to know. This plan has been tested sufficiently to prove its value. As an argument in its favour, I have not had a failure attributed to the method of working; a few of the plates have turned out inferior, either from untimed exposure, or over-development.

The idea of preparing the plates in this manner has been in some measure suggested by an article of Mr. Hardwich's in a late number of your journal; but for practical purposes, it matters little how we mix up the detail of one process with another, if we but obtain successful results.

By the pictures taken after complete washing it is certain that the image is not on the surface, but on the film; therefore the reason why the presence of free nitrate is not only unnecessary, but really injurious, however much it is required for its development. On this principle, the hazard and difficulty of completely washing it off before albumenising, without rendering the film beneath insensitive, is got rid of by decomposing it with chloride of sodium. At the risk of being tedious, I give my method of working:—Bake the *clean* plate in an oven; coat and sensitise in the ordinary way; let it remain a full time in the silver solution; plunge the plate into a vertical bath of distilled water, and, whilst it is there, economise time by coating and immersing your second plate. Dip the one in the water bath up and down a few times until it is no longer greasy; place it in a shallow dish with sufficient of the following solution to cover it:—Chloride of soda, 5 grains; rain-water, 1 ounce; filter. Common salt is too impure. Let this flow to and fro a few times, say about twenty seconds. Wash off the saline; and on the careful manner in which this is done, the resulting plate is either good, or good for nothing. I have found this plan answer :—Tie a piece of muslin over the tap as a strainer, and then convey the water by means of an indiarubber tube, into a washing-pan having a lip; the pan so placed that its lip projects over the sink: you thus get rid of the pressure from the tap, and have from the overflowing pan a soft stream that will not injure the most tender film, and is easily regulated. About a minute's washing will be sufficient; taking care that the back as well as the front of the plate gets its share of water. Drain slightly on a pad of filtering-paper, and albumenise with the usual formula, using two portions of the albumen. Let it first run from one end of the plate and off at the other, and thus carry with it the surplus water; and finally, well wash off the albumen for about two minutes for a stereo-plate. Surface dry spontaneously in a dark cupboard, and film dry with a heated flat-iron. The salt solution should be changed with each plate; on account of the particles of chloride of silver floating in it, it is scarcely worth the filter paper.

On theoretical grounds, plates so prepared should keep indefinitely. They give a vigorous negative; equalling the wet in half-tone, and not at all tedious to develop; and as they stop actinic rays remarkably, must not be made intense. Average exposure with 4½ Ross, and a fair light, three to four minutes, which is sensitive enough for any reasonable man.

The best negatives are produced by good exposure, and not over-developed. M. Willett, M.R.C.S.

Bristol, May 18, 1860.

P.S.—I have inclosed you a specimen for your judgment; your experienced eye will not confound the faults of the manipulation with the process. Exposure—middle of April—four minutes.

[The specimen sent is in every respect excellent.]

EXHIBITION OF PHOTOGRAPHS BY THE LANTERN.

To the Editor of the "Photographic News."

Sir,—I perfectly understood "T. R.," of Colne, and merely wished to supplement his communication by giving one or two reasons why the convertibility of a camera into a lantern is neither practicable nor desirable. Of course he can use his camera lenses as *part* of a lantern; and certainly, as he justly observes, these lenses "form an important item" in the cost. "Hopeful's" nine shillings' worth of optical adaptation, and his proposed box, I am not myself very hopeful of; for, unless you have a really good lantern, the best photograph will show upon the screen as little better than a confused blotch of light and shade. If you allow me to premise that I am a very third-rate practical photographer, I will offer a few remarks which may be acceptable to "Hopeful" and "T. R.," of Colne, as touching the preparation of photographs for lantern purposes. I have already said that they ought to be very delicate; let me add to this, that they ought to be so delicate (except in the case of *very* suitable subjects), as absolutely to need toning and colouring to make them effective. In the little that I have done, I have found the value of a photograph as a lantern slide to lie mainly in its exquisite outline and drawing, and only secondarily in its light and shade. My treatment of the photograph is this: When the film is perfectly dry, I place the slide on a slope, at an angle of forty-five degrees, with a piece of white card underneath, to throw a strong light through it; then, with a small scraper, I remove the film where the highest lights are required, and with the etching-needle open up details that stick too much together. I work thus until the picture pleases me, and seems to require only tone and colour to make it effective; and then I cover it with a thin coat of transparent varnish. When this is dry, I resort to the colours ordinarily used for painting lantern slides, but confine myself to the three primaries, mixing these for the various tints required, and adapting them to the thickness of film upon which they are to be laid. The finishing touch is to remove the varnish-film from the high lights. In the process I have attempted to describe, a little artistic skill and an eye for colour are obviously necessary; but there is no difficulty that the merest tyro in art may not overcome in a few trials. Writing thus, in the present tense, your correspondents may be led to infer that I am speaking of a present occupation; but I must tell them that I have produced nothing in photography for some years, and that I never went (except in a few portraits) beyond mere experimental trials, the results of which I took little care to preserve, as I always *intended* to go to work more seriously and carefully, but this I have never yet done.—I am, yours obediently, Thomas Rose.

Glasgow, May 19, 1860.

P.S. "T. R.'s" arrangement of the light has much to recommend it; I instanced the argand burner as an illuminator that was very effective in my own lantern.

DIRECT TRANSPARENT POSITIVES.

To the Editor of the "Photographic News."

Sir,—I beg to submit to your consideration the following simplified process of obtaining direct transparent positives, which has recently been brought under my notice :—

The collodion must be iodised with iodide of cadmium. The sensitising bath is of the usual strength: 30 to 35 grains of nitrate of silver to the ounce of water, in which must be dissolved, little by little, as much iodide of cadmium as it will take up. The collodioned plate is immersed in it, as usual, and exposed in the camera double the length of time necessary to obtain a negative. The developing solution is pyrogallic acid, but the image comes out positive, instead of negative.

As may be perceived, this is a very simple and easy method, which abridges manipulation in a remarkable manner.—I am, Sir, yours obediently, Fiat Experimentum.

Proceedings of Societies.

Blackheath Photographic Society.

The twenty-fourth ordinary meeting of this Society was held on Monday, the 21st inst., at the Golf Club-house, Blackheath Hill; the President, **Charles Heisch**, Esq., F.C.S., in the chair.

The Annual Report, the publication of which we must reserve till next week, was circulated in the room.

The minutes of the last meeting having been read and confirmed, the President made known to members a plan which was being agitated for holding a *soirée* during the present season, jointly with other Societies in the neighbourhood.

It was moved by Mr. **South**, and seconded by Mr. **John Harding**, "That this Society join the Greenwich Natural History Society, and the West Kent Microscopical Society in a *soirée*, to be held at some convenient time and place during the present season."

It was moved by Mr. **Glaisher**, seconded by Mr. **Spurrell**, "That this Society bear one-third of the expense of such *soirée*."

"That the President, two Secretaries, and Messrs. H. Terrel and Wood be appointed a Committee to meet that of the other Societies."

It was then resolved unanimously, "That a gold medal be offered to the Golf Club, as a recognition of their kindness to the Blackheath Photographic Society, in allowing the meetings of the Society to be held at their rooms; such medal to be considered as a prize medal, to be held under regulations to be laid down by the Golf Club. The Secretary to procure patterns and estimates, to be placed before the Society at its next meeting."

The **President** then called upon Mr. T. R. **Wheeler**, who proceeded to read a paper on—

THE SOLAR SPECTRUM IN ITS RELATION TO PHOTOGRAPHY.

With the double view of occupying a portion of this evening, when nothing of more importance presented itself, and offering a short *resumé* to such members as have not had an opportunity of reading the very interesting report of Professor Roscoe, of the experiments made by him and M. Bunsen, on the relative actinic power of light in various portions of the world, presented to the Royal Society, I have taken the solar spectrum for a text, and if I do not pretend to bring forward anything original on the subject, I trust that I shall succeed in arresting your attention while I place in correlative order, some of the phenomena of that most important imponderable agent—light. We call it an imponderable agent, and so it is, for it exerts an influence, in common with heat and electricity, without adding to the weight or bulk of the substance acted upon, and we judge of its nature and amount by the force which it is capable of exerting, rather than by its tangible presence.

The question, therefore, "What is light?" is one which is more readily asked than answered, and I shall not occupy time in discussing either the corpusculary or undulatory theory, or speak further, during this short essay, of many of the phenomena of light, which are so far foreign to my present object, viz., reflection, refraction, polarity, and epipolic dispersion.

> "From matter streaming, it makes matter bright,
> Matter arrests it on its onward flight,
> And so I fancy 'twill but have its day,
> And, when that matter endeth, fade away."—Faust.

The investigation of the imponderable agents is attended with considerable difficulty, it being often hard to separate abstract from concrete, force from matter. If the speculations of MM. Grove and Seguin be correct, there are only two things in nature—matter and motion; the former an "entity," the latter a "state." The facts associated with the action of the imponderable agents, come under that class called in natural philosophy "ultimate"—that is, which resist analysis, and are rather subjects for speculation than perfect comprehension, whose *effects* only we observe, and are but rarely able to refer to a *proximate* origin; while their *primary* causes will probably for ever remain with their great Originator.

In nature, however, analogy seems to be a leading principle, nothing existing, as it were, isolated, and no abrupt transition being found to exist. On this account, Grove has framed his theory of a "homogenesis, or correlation of physical forces." In this sense, we conceive light, heat, and electricity to be cognate powers, one being convertible into the other by any circumstance which is capable of changing their *states*. But this change always takes place in definite proportions, and the quantity of one force expended is in direct relation to the quantity of the force generated.

A ray of light impinging upon a daguerreotype plate forming part of a galvanic circuit, to which a galvanometer is affixed, sensibly affects it, and, at the samo time, occasions a change of temperature, indicated by a thermometer. The change which light causes upon any sensitive surface is believed to be in its molecular arrangement.

Hence, it appears to me that a close analogy exists between the molecular action of light and what is called "catalytic action" in chemistry, the latter being an impulse communicated by the molecules of a body in motion to those of a body in a state of rest, inducing a change in the latter without the motive body itself undergoing change. A familiar instance is known in fermentation; the presence of spongy platinum causes the chemical combination of hydrogen and oxygen gases with explosion; and, not to multiply examples, several instances of a similar nature are known to chemists.

The allotropic condition of certain chemical substances occasioned by heat, and which can only be explained by the supposition of an alteration in their molecular states, is another striking point of analogy between light and heat, electricity being sometimes an effect, and sometimes a cause of both. Having premised this, I proceed to the consideration of the proper matter of my discourse.

It is familiar knowledge that several portions of the prismatic spectrum, however produced, possess different physical characters, or, to speak more plainly, exert different physical actions, and it is equally well known that the red, the least refrangible, the most slowly-vibrating rays are those which contain, so to speak, the heat principle, or which, exerting a distinct influence upon thermometric variations, modify our climate, and are the proximate causes affecting the fall of rain and the current of winds, while the most refrangible and rapidly-vibrating rays, those near the violet end of the spectrum, are chiefly concerned in chemical agency, and though not, in truth, the most highly illuminating, have, nevertheless, the most intimate relation with the photographer, inasmuch as, by their influence, those changes are effected on which his art depends.

The importance of the subject will be readily conceded; so great an interest has been attached to it by philosophers, that a serious question has arisen among them, whether the chemical ray were not a fourth imponderable agent, and the heat ray a fifth. A considerable portion of the *Philosophical Magazine*, for the years 1843-4, will be found to be devoted to this discussion; and Professer Draper, of New York, designated the chemical ray "Tithonicity," and our countryman, R. Hunt, "Energia," the latter a purely abstract, the former a purely fanciful term, neither of which have, I believe, been permanently received by the scientific world, or tho category of imponderable agents extended to meet these theories.

To measure the amount and variation of these particular rays has always been a great desideratum with the philosopher and, *à fortiori*, with the photographer, and hence, from time to time, various actinometers have been proposed; and if, as Mr. Roscoe has well observed, any instrument could be invented to be worked on the principle which renders the thermometer so valuable, and which has been termed the first law of Marriotte—viz., that the expansion of the column of mercury is equal, with equal increments of heat—then a perfect actinometer would be presented to the public. To find such an arrangement, and to apply it to investigating the amount of chemical light in the ray in different parts of the world, was the object which MM. Bunsen and Roscoe proposed to themselves, and I shall confine myself for the present to a description, taken from Mr. Roscoe's report, of tho mode by which they carried it into effect.

I have before stated that various photometers had been proposed, the principle of which was somewhat similar, by the exposure of certain chemical compounds to the action of light, such, that either a re-arrangement of their constituents should take place under its influence, or actual decomposition with the extrication of some gaseous product, the amount of which being calculated, afforded an approximate conclusion as to the power exerted by the light. I shall first mention that of Sir John Herschel, in 1840, or, more properly, perhaps, that of Mr. Jordan, in 1839. These were simply sheets of photographic paper wound round a cylinder inclosed in another cylinder, which was moved on its own axis, at a definite rate, by means of clock-work. The light being admitted through vertical slits in the outer cylinder, impinged upon the sensitive surface, and, by adjusting the rapidity of its movements so as to keep the slit always opposite the sun, the paper recorded every variation in its light. It may not be superfluous to state that the arrangement did not differ materially from that at present in operation at the Royal Observatory for registering the diurnal variations in the magnet by artificial light, under the able superintendence of our friend, the late President.

Mr. Hunt next produced an instrument, which he termed an actinograph, of a somewhat more complicated nature, but upon the same principle. Professor Draper, of New York, has, perhaps, devoted more time and attention to the question than any other philosopher. Commencing with the action of light upon surfaces of chloride and bromide of silver, he suggested an instrument, to which he gave the name of a tithonometer, from "tithonicity," the title he invented for the chemical ray. This consisted of a mixture of hydrogen and chlorine in equal parts, which, being exposed to light, were known to combine to form hydrochloric acid with such energy as sometimes to cause explosion. Other actinometers have been proposed, but this presents the special interest of being the one chosen by MM. Bunsen and Roscoe, with some modifications, which appeared to be approved by Professor Draper, for their extended experiments.

Before I proceed further with a detail of these experiments and their results, I may as well complete the history of photometry (mentioning incidentally the names of MM. Fave and Silbermann—the latter the inventor of the heliostat—and of M. Claudet, an experimenter in the same direction) by an account of other photometers which have been from time to time suggested, such as the peroxalate of iron proposed by Professor Draper, modified by Dr. Woods. It will be perceived that three distinct methods aro recognised in the above description—the dry method, or simple exposure of a dry, sensitive surface to the action of light; the moist, where a solution of a salt, decomposable by light, is employed; the gaseous, where a mechanical mixture of gases is submitted to light; and, under such exposure, a chemical combination occurs, together with the formation of a definite chemical compound. Where a solution of the peroxalato of iron is employed—which is naturally of a golden yellow colour, and, in the dark, may be preserved unchanged for a great length of time, after exposure to solar, or even to artificial, light—decomposition takes place; a pale yellow precipitate of protoxalate of iron falls down, and carbonic acid gas is evolved. The amount of this may either be estimated by weight or volume, or by the weight of gold or silver which the solution, *after exposure*, is able to precipitate.

The following equation will show the nature of the arrangement just described:—

$$Fe_2O_3,3C_2O_3=2(FeO,C_2O_3)+2CO_2.$$

Besides the peroxalate of iron, Mr. C. J. Burnett suggested, in 1858, an actinometer, in which the fluid to be acted upon by light consisted of the oxalate of uranium in solution, and the carbonic acid generated by its decomposition impinged upon a column of mercury, which rose according to the pressure, in a bent tube, to which was attached a graduated scale—an ingenious and simple arrangement, and one infinitely more easy of application than that employed by MM. Bunsen and Roscoe—viz., the tithonometer of Professor Draper—but infinitely less sensitive where very great accuracy is desired.

The chemical ray, then, as has been shown, having a synthetic action upon a mixture of chlorine and hydrogen, in direct proportion to its energy and amount (it is stated by Professor Draper, that the light of tho electric spark, whose duration does not exceed an infinitesimal fraction of a second, will cause explosion), MM. Bunsen and Roscoe availed themselves of the fact, by submitting a mixture of these gases prepared from hydrochloric acid by electrolysis, or the decomposition of the acid by voltaic electricity (for the purpose of avoiding error) to a known quantity of light, estimated by comparing the illuminating power of a ray reflected by a Silbermann's heliostat, through a small aperture into a dark room, with what they called a standard flame, such as the ignition of a jet of carbonic oxide of a given size produces at the distance of a mètre, or 39 inches, in one minute of time; and that they called one unit of chemical action; and comparing the amount of combination of the chlorine and hydrogen to form hydrochloric acid, which was found to take place, with many results, established the relations I shall presently detail between the light energy in various parts of the world. The fraction of the sun's rays being calculated, it follows that the whole amount of light emanating from the sun can be found; if allowed to shine upon the instrument directly, the action would be too rapid, and the instrument shattered.

I now quote Mr. Roscoe's pamphlet almost verbatim, although I condense the matter of his report:—

The day chosen for experiment must be cloudless, and the observations continued from sunrise to sunset.

It would appear that the actinic power increases in inverse proportion to the column of air through which the sun's rays have to pass. In other words, the light energy increases from the time the sun clears the horizon until it has attained its meridian height, and afterwards decreases in something like the same ratio, so that there are two periods in each day when, all things being equal, the same chemical action is observed.

"The rays, in passing through the air, are extinguished or absorbed as light, and as the sun rises above the horizon, the column of air being lessened through which the solar rays have to pass, more of the direct rays reach the earth."

The law by which this absorption of rays obtains can be deduced experimentally, and therefore, if the action of the sun at any given height is known, its action at any other height can be calculated.

This calculation being made, agrees very remarkably with the results of observation. I cannot reproduce, verbatim, Mr. Roscoe's tables, but I may be permitted to relate the general issue of his experiments conducted at Melville Island, Rejkiavik (in Iceland), Heidelberg, St. Petersburg, Naples, Manchester, Cairo.

These experiments gave the light action in four forms, viz.:—

1. The action of direct sunlight in degrees of light.
2. The same of diffuse daylight in degrees of light.
3. The same of total light in degrees of daylight.
4. The action of total lights in light mètres.

In the latter, it was found that the total chemical action effected by the solar rays, from sunrise to sunset, at the vernal equinox, was—

Melville Island	1306
Rejkiavik	2324
Petersburg	2806
Manchester	3625
Heidelberg	4136
Naples	5226
Cairo	6437

or five times as great in round numbers at Cairo as at Melville Island, and probably would be found even greater in situations nearer the equator.

I had hoped to have been able, with the kind assistance of your President, to have exhibited this evening the action of the prismatic spectrum, obtained by passing a ray of light from the poles of a Grove's battery through a prism, upon a surface of sensitive paper, or upon a wet collodion plate. You would have then had ocular proof of the intensity of action exhibited by the various rays. As it is, I must simply state as above, that it will be found greatest at the violet end of the spectrum, and least at the red.

Now, gentlemen, it is impossible to overrate the importance of investigations like these. To the casual observer they present a few bubbles of gas rising to the surface of a fluid, a column of mercury rising or falling the fraction of an inch, a surface of paper more or less discoloured. To the deeper thinker—to the more profound inquirer they afford an insight into those agencies by which the Great Creator is pleased to regulate and control what we see around us in His creation. In fact, we recognise in light one of

> "The vast magazine of means
> Formed at His word, and ready at His will."

It is difficult to say where the action of light really ends. The succession of the seasons, the growth of plants, as also the distribution of those cognate groupings which constitute the flora and fauna of countries, all have a relation, and that a direct one, both positively and negatively, with this influence; and last, not least, the physical state of mankind, and no small part of what we call Hygiene, depends directly upon it. Is it going too far to say that his moral nature is likewise in any way under its influence? Certain it is that the human race becomes deteriorated in proportion as physical laws are neglected or perverted; and it is very hard to determine at what precise point one influence ends, and another begins. Do not misunderstand me in this.

The nature of the influence which light exerts in a substance, either nascent, in a state of change, or so loosely aggregated that a change may be effected in it, being molecular, leads me to say a word upon the etiolation of plants.

Plants, it is well known, when grown in the dark, do *not* develop the qualities and proximate principles which belong to them as members of natural orders, but are found bleached, watery, and devoid of colouring matter, or chlorophyll. What is this but the absence of that chemical force by which molecular aggregation is regulated? It matters not whether it be the blue ray or the yellow which is concerned in the agency; it is clear that an action is absent in the one case which is present in the other. Combinations of carbon and water are found indeed, *without* light, but *with* it are developed those more complex arrangements which are deservedly called "organic," inasmuch as they are generated by the stimulus and under the direct control of vitality. So that it is not jumping to a conclusion, but deducing, as a necessary consequence, from the foregoing reasoning, that there is a relation, and that a very intimate one, between light and vitality, either as cause and effect, or, at all events, as an accessory fact.

To such a point have these researches been pushed, that MM. Bunsen and Roscoe, not content with measuring the actinic force in various parts of the earth, have been actually enabled to apply that measurement (roughly estimated, indeed, but still approximately true) to the relative chemical power of light in the various planets forming part of our solar system. Admitting its immense influence upon the organic life developed in this terrestrial globe, and admitting some analogy to exist between members of a system where harmony, order, and co-ordinate relation appear transcendent, is it presumptuous, and is it wholly unprofitable, to speculate upon the states and conditions of other orbs which have this community of light influence, superadded to the universally-prevailing law of gravitation?

True, such speculations can never wholly be verified. Still, whatever enables us to make large generalisations, by establishing relations between the scattered members of a vast group, elevates the mind of man, and, raising him far above the things of time and space, gives him a faint perception, and that the only one he can hope for in his mortal condition, of the tremendous questions of Infinity and Eternity.

At the conclusion of Mr. Wheeler's paper, the PRESIDENT described the mode in which paper was prepared for photometric purposes, explaining the difficulty which attended it, and the precaution necessary.

A vote of thanks was cordially tendered to Mr. Wheeler.

Mr. MELHUISH then exhibited some magnificent photographs of Rome, also a particularly interesting series of stereoscopic Sicilian views, lately photographed by Mr. Napper.

The meeting then adjourned.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

WE resume our report of the meeting of this Society on the 17th inst. The following is the conclusion of the paper read by the Rev. F. F. STATHAM, the President, on

THE APPLICATION OF PHOTOGRAPHY TO SCIENTIFIC PURSUITS.

In military operations the camera is invaluable for taking views of fortifications to be attacked, chronicling the effects of fire upon breaches, giving accurate transcripts of the nature and difficulties of any line of route to be pursued, and perhaps even telling tales, by one momentary glimpse from a balloon, of the effective force which may be expected in the field, or revealing the whole plan of the campaign, from a chance copy of a dispatch, stolen by the aid of a sunbeam from a sleeping *aide-de-camp's sabretache*. In addition to which, we must not forget that the photographic records of past military struggles are not without their value to the student of strategic science, and that plans of dismantled and vanquished storming-places may still be useful, as offering warnings against the blunders of the past, or hints of improved modes of attack, in case of future hostile operations. Fenton's series of views of the Crimean Campaign will abundantly illustrate the force of my remarks, and prove, I doubt not, useful plates of instruction, to those anxious thoroughly to comprehend the nature and the difficulties of that fearful struggle. In *Natural History* generally the appliances of photography cannot fail to be of the utmost value. Zoology will rejoice as it sees pictures of birds or animals, hitherto unacclimatised in this country, accurately delineated, with all the peculiar features of the originals. *Botany* will be advanced by the easy identification of every form of vegetable life, in all its minuteness of perfection, by the aid of the camera. *Mineralogy* will be indebted to it for accurate copies of its choicest specimens, some of which crystallise in such complicated groups as to be excessively difficult of delineation by any other means; and the works of nature in general, such as gorgonias, sea anemones, the infinite varieties of coral, marine algæ, sponges, echinites, and other forms of animal, vegetable, or zoophytic life, will be easily represented with the assistance of photography, where, before, weeks and even months would have been consumed in making accurate transcripts of them. *Astronomy* already owes a deep debt to photographic art. By her aid the moon has been compelled to lend her own light in order to furnish faithful portraits of herself. The sun has, I am sure, recorded the passage of spots across its surface, and the exact appearance of a partial eclipse; and the cometary bodies have been made to leave the impress of their faint light upon the sensitised paper. It will not be presumptuous to predict that all future astronomical phenomena will be rendered more definite in their teaching by the increased facilities which the camera will afford for recording minutely their various phases; and perhaps, even in the case of transits--viewed from different parts of the earth's surface—the application of photography may enable us to obtain a precision, and to multiply our observations to such an extent, as to be of the utmost importance to the advance of astronomical truth. The science of *Optics*, also, has derived no inconsiderable advantage from the steady progress of the study of photography. Not to mention the researches of Herschel, Hunt, Stokes, and others, into the nature and properties of the actinic rays—not to speak of the great improvements which photography has developed in the manufacture of lenses, of cameras, and of stereoscopes (which last form of instrument has been gradually so far monopolised as to be scarcely used at all now, except for the display of photographic slides)—numerous optical questions of the deepest interest, affecting the distortion of objects, the aberration of rays, the origin of colour, and other kindred topics, have at intervals been brought out by the prosecution of photography, and have been solved, with more or less success, to the general advantage of optical science. The possibility of producing photographs in their natural colours is a problem of this kind still remaining to be solved; and although no very marked progress has attended the exertions of recent experimenters in the field of practice, the early successes of Sir John Herschel, in procuring a coloured image of the solar spectrum, would seem to hold out the hope that the process is not only practicable but probable, and needs only patient investigation to render success certain. *History* and *Biography* will owe much of their future truthfulness to the aid they are gradually receiving from the photographic art. The deciphering of ancient manuscripts has already been much forwarded by the multiplication of copies, photographically obtained, which have been submitted to learned archæologists, at a distance, to be translated or interpreted at their leisure. Copies of rare prints and engravings; *fac-similes* of seals, coins, and antique implements; duplicates of the records for ages stored up in the custody of the Master of the Rolls—these and numerous similar applications of photography will serve as examples of the benefits already conferred upon the student of history by this ever-useful art. But, beyond this, the future historian will have reliable materials, derived from the same source, upon which to base his observations. Scenes of historic interest are stereotyped as they pass; the portraits of those who live even but for a short time in the favour of the public are rapidly snatched and transferred to paper; and every incident calculated to arrest public attention is, by the aid of the camera, first speedily noted down, and then, most probably, transferred, by the tool of the engraver, to the pages of our illustrated public prints. What would not Hume or Macaulay have given for an *Illustrated London News* of the date of Charles I. or Queen Elizabeth? And a great proportion of the wood-engravings in this admirable record of the passing age are derived from sketches originally procured by the aid of photography. What should we not now be willing to give for the actual presentments of Shakespeare, Milton, or Pope, if we could be sure they were as faithful representatives of the originals as our modern photographic likenesses most commonly are? Well, the future historian will, in all probability, be enabled to illustrate his works not only with accurate portraits of all the great heroes, statesmen, and authors of the age whose transactions he professes to chronicle, but with views of every scene amidst which the plot of his story may chance to run; with authentic glimpses at the costumes, the buildings, the amusements; the battles and sieges; the crimes and punishments; the whole round, in fact, of that which goes to make up the life and business of a nation. But I must draw my observations to a close, although I feel there is still much matter before me in which I might expatiate almost *ad infinitum* on the advantages which photography has already conferred, or is hereafter calculated to confer, on the various branches of science. The theme is one that admits of indefinite expansion; and this fact alone might go to prove the invaluable character of the agency which is capable of such almost boundless applicability. Too many persons have hitherto regarded photography as an amusing pursuit, rather than as a means to an end; they have identified it mainly with the taking of portraits or pretty views, or, at farthest, as a medium for multiplying interesting stereoscopic slides. If, gentlemen, by the observations I have made, I shall have shown that it is rather to be looked upon as a new lever placed in our hands, whereby to raise to a higher level every one of the sciences in turn, I shall not have failed in the object which I originally had in view, nor will you have favoured me—as you have so patiently done—with your lengthened attention in vain.

The reverend gentleman, who was listened to throughout with most marked attention, then resumed his seat amidst much applause.

A vote of thanks was carried by acclamation to Mr. Statham, for his suggestive address.

Mr. Ackland at this point of the proceedings vacated the chair, and the President having taken his seat, intimated that Mr. Ackland now wished to make a communication of considerable importance.

Mr. ACKLAND said, in February last he read a paper upon the defects in the dry process. Since then he had operated a little, and he had resolved to acquaint the Society with the results of his researches, which he was glad to say had been attended with a certain amount of success. He had commenced by taking notes of everything that he did, and he would recommend all photographers to follow the same course. He entered in his note-book the temperature of the room, the collodion used, the materials employed, and, in fact, everything capable of being referred to, and he was well satisfied with the results. He commenced with the collodion he had formerly used, and stained plates was the only result. He always used six drachms of water (as supplied by the Lambeth Water Company) to wash a stereoscopic size plate, on removal from the nitrate bath, and he noticed that, with newly-iodised collodion, the water, after being used, was only slightly milky, whereas, with collodion iodised a month or two previously, the milkiness was very apparent. He had further noticed that plates prepared with newly-iodised collodion invariably gave black, wavy stains towards the end placed lowest in drying; whilst those prepared with old collodion gave transparent markings, mostly proceeding from the point where the albumen was first poured on. The compact nature of the newly-iodised collodion film does not allow the washing waters or albumen to dilute or decompose the bath solution contained in the substance of the film; hence, in drying plates so coated, the concentrated solution is gradually brought to the surface, and acts on the albumen present, causing the black, wavy stains; but the compact nature of this film serves us beneficially in another way, for with either four or six drachms of water the "surface" bath solution is sufficiently diluted to prevent the transparent or albumen stains. He next remarked that the film produced by old collodion allows the washing water to enter and dilute not only the "surface" solution, but also that contained in the substance of the film: hence he never obtains black stains with such collodion, but is frequently annoyed with those caused by albumen. These results are curious, and he considered the subject long, and at length came to the conclusion that the effect was produced by a mechanical change in the collodion. In what did that change consist? was the point he had now to settle. He took the collodion, and, upon carefully experimenting, he found that the older it got the more porous it became, the plates were less sensitive, and took a longer time to develop. Professor Hardwich, in a paper on the dry process, mentioned that it took a long time to develop a Fothergill plate; but the pictures which he (Mr. Ackland) now produced had been developed in two minutes. On again reading the paper carefully, he found the collodion referred to was porous collodion. Now, was this necessary for the dry process? He considered it might be useful for all processes but Fothergill's. He considered it quite possible, however, to obviate the defect; and in order to do so, he proceeded as follows:—He coats his plate with a mixture of newly-iodised and old collodion; washes in six drachms of water, and coats with albumen, by which means all the surface solution is either removed or decomposed. In order to decompose that still remaining in the film, he allows the albumen to remain on three or four minutes, and then soaks the plate in a solution of common salt in water; and finally, he washes off the albumen and salt solution in the usual manner. He stated that the mixture of a portion of old collodion with some newly iodised, was absolutely necessary to give intensity. In these remarks he had merely endeavoured to show how those two kinds of marks or stains, constantly recurring in photography, could be obviated, combined with great rapidity of development and sufficient softness, and that results could be obtained with the dry process quite equal to the wet.

Mr. HANNAFORD said, very great stress had been laid upon the necessity of diluting the albumen, but he could use it without a particle of water, and without the chance of getting any stains, simply by mixing it with a large quantity of ammonia.

As to using chloride of sodium, he thought that was very advantageous in more than one point of view. He had always adopted the principle of using acetate of soda. He considered the Fothergill process very useful for small plates, but he had his fears of its adaptability for large ones.

Some further conversation ensued, in the course of which Mr. Hannaford said he preferred washing at the tap, and Mr. Ackland held the opinion that the tray was better for the purpose.

Mr. **Leek** introduced a modification of the tent exhibited by him at an early meeting of the Society, and also a convenient packing case to contain all the various paraphernalia requisite for a day's out-door photography. The tent consists primarily of a shallow box or tray about 22 inches long, 12 wide, and 2 deep, the lid forming the top of the tent. Round these sides is secured the covering of black and yellow calico; and a curtain of the same materials wraps round the operator, and excludes the light. The top is supported by two light iron rods, which keep the covering in a state of tension, and thus insures perfect rapidity. An aperture in front admits sufficient light for convenient working, and a gutta-percha tray, with a pipe attached, carries off the waste water. The whole is supported by a tripod of a height to suit the operator. For stereoscopic pictures, the size of the packing case is about 11 inches long, 11 high, and 6 thick. It contains spaces for the camera, bath, plate-box, chemicals, and every requisite for a day's out-door work; and a separate compartment being provided for each article required, the operator can tell at a glance if anything is missing.

After a vote of thanks to the Chairman the meeting separated.

Miscellaneous.

Improvements in Steam Power, &c.—If all the discoveries, inventions, and improvements directed to the economy of fuel and motive power were combined in one vessel, a most remarkable result would doubtless ensue, exhibiting nothing less than an entire revolution in the means of transit. Steam is economised and fuel saved by M. Beauregard's generator for superheated steam and M. Lenoirs' carbonised water-gas for fuel. Messrs. Prouvost and Lancy have now perfected their hot-air engine, which is so powerful that it impels ships at the rate of twelve to fourteen knots per hour, with a consumption of fuel no greater than is required for ordinary cooking operations, by which a saving to France of upwards of eighty millions of francs for fuel for the steam navy will be effected, and the obnoxious feature in the treaty with France be rendered nugatory, as that country will be able to dispense with our coals altogether. Following closely on the heels of these discoveries and inventions is that of M. Busson, whose new propeller dispenses with two-thirds of the motive force now required for paddle or screw. M. Busson's invention is styled the *conical turbine;* it is placed in the prow of the ship. With a velocity of sixty revolutions per minute, produced by a force not exceeding twenty-five pounds, a model-boat, sixteen feet in length by four in breadth, moves at the rate of fourteen miles an hour. M. Busson calculates that a vessel requiring a force of 800 horse power may dispense with 600, when fitted with his conical turbine.

New Photographic Apparatus.

NEW PLATE-HOLDER, INVENTED BY M. LEJEUNE.

The plate-holders hitherto invented are all more or less imperfect, while the number of them clearly shows the importance attached to their perfection. Doubtless most of the spots and stains, by which negatives are spoiled, are due to handling the plates with soiled fingers, the inevitable consequence of proceeding from one operation to another in obtaining a negative.

No contrivance that we have hitherto seen admits of the plates being immersed in the various baths with safety, cleanliness, and promptitude. And we must also reckon among the causes of failure the decomposition the baths undergo through contact of organic matters left upon the plates by soiled hands, always more or less impregnated with substances which washing, however frequently performed, never entirely removes. The insensible perspiration from the fingers, even, is the cause of more failures than the unskilfulness of manipulators.

A truly useful plate-holder must combine the following conditions:—

It must admit of being employed promptly and with facility; it must enable the operator to hold a plate rigidly, and admit of its being seen over its entire surface, as a transparency; to extend the collodion or albumen; and to be immersed in the baths without removal from the holder; to be submitted to the developing and fixing solutions; and of being washed and suspended, wherever a nail can be fixed, to drain and dry; lastly, it should be of a moderate price.

All these advantages, so difficult to combine, are, nevertheless, found in a very simple little implement, and of a price within the reach of every photographer. The first glance will show the advantages it presents over all other plate-holders; a slight pressure of the hand is sufficient to open the branches for the insertion of a plate, which is held rigidly until another pressure instantly releases it, leaving the hand of the operator entirely at liberty. This plate-holder is composed of a certain length of iron, or silver, or silvered copper wire, of a thickness proportioned to the size of the plates it is intended to hold. It is first rolled one turn and a half at the middle, M, round a mandril, forming the spring, R, then turned to a certain calibre, producing the development of the branches, M, A, B, and C, D, spreading to the point V, where they pass through a brass ring, which prevents them separating. The extremity of the branches opposite the spring is terminated by an appendix in bone or ivory, *o*′, sustained by two brass rivets, and presenting at its enlarged base a groove within which the plates are introduced, when, by a pressure of the hand upon the branches A and B, those at C and D are forced apart sufficiently to receive them. These bone appendices are shown at *o*′ and *o*″.

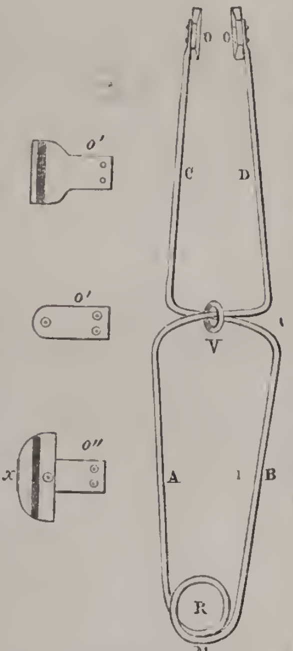

Fig. 1.

For certain operations, these appendices are modified by terminating in another piece of bone, *x*, supported by a fine silver pin, which serves as pivot, and admits of giving a rotary motion to the plates inserted in the grooves, by means of which the surfaces are placed either upwards or downwards. The implement thus constructed is covered with a coating of lac or other hard varnish, to preserve the metal from chemical action,

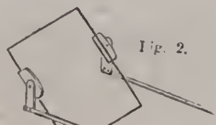
Fig. 2.

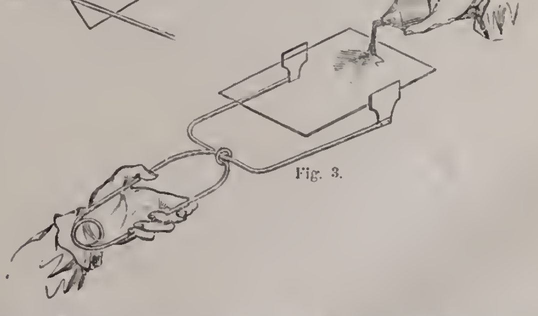
Fig. 3.

Fig. 2 shows, better than any description, how the plate is taken by the two branches of the holder in coating the glass, or in developing the image.

By means of this plate-holder a negative can be submitted to all the operations of a process without being touched by the hands. If this is an advantage in the wet processes, it is much greater in the dry, for we not only no longer see the spots which compel the careless amateur to abandon the process, but the time of the operations of preparing the plates, which leave the holder ready for the dark slide, is abridged one half.

This little apparatus is patented by Messrs. Gaudin, *frères*, and will doubtless soon be in the possession of every photographer.

Photographic Notes and Queries.

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PHOTOGRAPHIC VOCABULARY.

SIR, There appears to be an extraordinary vagueness of expression in writers on photographic subjects, which, doubtless, leads to much confusion in the minds of those who are not deeply versed in all the arcana of our art. For instance, what word is so much abused as "*process?*" The slightest variation in a formula is styled "a new process." Now I take it, that the *processes*, strictly so called, are but very few in number. First, there is the Daguerreotype process, distinct from all others, both in its manipulation, and in the material on which the pictures are taken. Whenever this process is named, we clearly comprehend what is meant. Another process, distinguished also by the material upon which the negative images are taken, and the manipulation, is the Talbotype, or photography on paper; a great many variations have been suggested and put into practice in connection with this process, but they should not be dignified with the title of "new processes," but "methods;" for however much the manipulation may differ in the hands of various operators, all methods in which the negatives are taken on paper must strictly belong to the Talbotype process. Another distinct process is that of albumen on glass-plates. The original process, proposed by M. Niepce, remains intact; but an offshoot appeared, proposed by M. Taupenôt, which consisted in a union of the albumen process with the collodion process, and may fairly claim the title of a new process; but the *variations* in this process, instead of being dignified with the title of A or B's process, should simply be A or B's "method," as the variations introduced are nothing without the original process for a basis. In the collodion process, we have a very long catalogue of pseudo-processes, which consist in nothing but suggestions—practicable, or otherwise—for retaining the collodion film in a moist state. Writers on photography should not speak of the "gum process," but of the "gum method;" not of the "oxymel process," but of the "oxymel method;" and so on with the rest, from honey down to raspberry syrup. From what I have stated, it will be seen that, correctly speaking, there are but four, or, at most, five processes, viz., Daguerreotype, or photography on metal plates; Talbotype, or photography on paper, for negatives; Niepceotype, or photography on albumenised glass plates; and Archerotype, or photography on collodioned glass plates. As for M. Taupenôt's, although a combination of albumen and collodion as a sensitive vehicle—in which respect it divides its claim between two distinct processes—it is none the less, I think, entitled to take an individual place, and rank with the others; and we may, therefore, speak of the Taupenôtype process; not of the "Fothergill process," but of the "Fothergill method," seeing that the principle is the same, with a slight modification. If writers will take this hint, kindly meant, they will save some confusion, and contribute to rendering honour to whom honour is due.—Yours, &c. HORN BOOK.

CARBON PRINTING.

SIR,—We have heard very little lately about carbon printing, from which I conclude it has not taken that hold of the photographic affections which was expected and prophesied of it. But if the attempts hitherto made have not been so successful as could be wished, there is no reason why others should not be made in the same, or in parallel directions.

Reading the accounts of zinco-photography, in the "NEWS" of March 16, I conceived that the process contained the germ of a good carbon-printing process. Suppose the positive taken on bichromate of potassa and gelatine, and the parts unacted upon by light dissolved out, then lay the proof on a sheet of blotting paper, on a hard smooth substance. If we pass an inked roller over it, we shall obtain a picture in printing ink, or carbon; then wash the proof in water, acidulated with nitric acid, to dissolve out the remaining bichromate. In this manner, with certain subjects not possessing very fine detail, we may readily obtain proofs, to all intents and purposes, identical with copper-plate engravings and woodcuts, and of course as durable.—I am, Sir, your most obedient servant, L. L.

MEETINGS OF PHOTOGRAPHIC SOCIETIES.

Tuesday, May 29—Birmingham Photographic Society.
Wednesday, ,, 30—North London Photographic Society.
Friday, June 1—Norwich Photographic Society.
Tuesday, ,, 5—London Photographic Society.
Thursday, ,, 7—Belfast Photographic Society.
Wednesday, ,, 13—Chorlton Photographic Society.
Monday, ,, 18—Blackheath Photographic Society.
Thursday, ,, 21—South London Photographic Anniversary.

TO CORRESPONDENTS.

STEREOSCOPIC EXCHANGE CLUB.—We have received several communications on this subject, to which we propose to reply next week.

⁂ DRY ALBUMEN PROCESS.—Will Mr. J. Archer favour us with his address?

WE shall be happy to receive the communication to which Mr. T. Martin refers.

J. L.—You can get any amount of light you require by using white screens to reflect the direct light. Your pictures are flat, because the light is too uniform: the quantity of light is not of so much importance as its judicious distribution. Place your sitter opposite the window—but nearly sideways, so that one-half of the figure is in good light. Put a white screen of calico on the other side, to reflect light upon the dark side of the sitter; you will thus get the half-tones without heavy shadows.

E. W.—Use Marion's or Canson's paper; put no acid in your sensitising bath. It is sufficient to wash the proofs in pure water; nothing is gained by putting them in salt and water. The discolouring may be prevented by washing the pictures in alkaline water when they are taken out of the toning bath, previous to putting them in the hypo. solution. The proofs you inclosed appear to have been too long in the toning bath.

AN AMATEUR.—Protonitrate of iron may be prepared by mixing a solution of protosulphate of iron. 140 grains, in three ounces of distilled water, with 102 grains of nitrate of potash, dissolved in three ounces of water; then add two drachms of glacial acetic acid. It is fit for use so long as it does not become red.

THOS. COLLINS.—The surest way to recover the silver is to fuse the nitrite until all the acid is driven off, then dissolve the metal in nitric acid. The fog appears due to the presence of organic matter, probably in the rain-water. We can see no other solution of your difficulty.

I. (Kendal.)—Mr. Maxwell-Lyte's toning-bath is composed of chloride of gold 15 grains, phosphate of soda 300 grains, distilled water 1¾ pints. This may be kept in a bottle, ready for use, but the portion employed for toning must not be returned to the bottle.

A SUBSCRIBER AND AMATEUR.—1. We cannot give you the reason for the collodion behaving in the manner you describe; that is the secret of the maker. You had better address yourself to him. 2. You can use the dipper, without fear.

MOSES.—The evaporation must be conducted in a glass or porcelain vessel. If the solution is acid it will not do for printing, unless the acid be neutralised with ammonia.

J. HARVEY.—You had better supply yourself with a metal camera. The journey you contemplate is so difficult, that you should encumber yourself with as little baggage as possible. Therefore try the waxed-paper process.

A TYRO.—You had better adhere to one process, which you can master by perseverance. If you fly from one to another in impatience, you will never succeed in any.

S. S.—There are many forms of portable cameras, which you can see at a dealer's of photographic materials. We cannot undertake to recommend any particular one

VARRON.—We do not advise your putting your bath in the sunshine; better to evaporate it to crystals, and re-crystallise, until the crystals become colourless.

If. VERNON.—Cereoline is obtained by boiling 10 ounces of pure white wax in 20 ounces of alcohol. When cooled, the cerine and myricine are deposited, and the cereoline remains in solution.

ALFRED.—It is not at all likely you will succeed in making good positive collodion, and you can buy it as cheap as you can make it.

G. B. D.—The fault appears to be in the manipulation. P. has been too long in the toning bath. In X. the paper is bad; see answer to "E. W."

NEMO.—The camera lucida is not applicable to photography, like the camera obscura.

H. H.—If your apparatus and chemicals are as perfect as you describe, the fault must lie in the manipulation.

SEWARD.—Patent plate is the name given to the glass generally used for photographic purposes.

T. TAYLOR.—Fused nitrate of silver is generally sufficiently acid; 30 to 35 grains to the ounce of distilled water.

O. P.—We are acquainted with photographers who are using lenses by the maker in question, and they appear to be very well satisfied with them.

N. NORTON.—We do not desire a better developer for negatives than two grains each of citric and pyrogallic acids to the ounce of water.

A. W.—You will find it rather difficult to make sugar of milk. You can purchase it of the dealers in photographic materials.

PYRO.—You will require Marion's "turpentine waxed-paper, iodised," for the Rev. Lawson Sisson's process.

N. P.—The addition of a bromide is recommended; we think it better to employ one having the same base as the iodide.

ARGENTUM.—You have doubtless converted the nitrate into nitrite, by the application of too great a heat.

J. H.—There is a considerable difference between dry collodion and preserved collodion. You doubtless intend the latter.

HAXELL.—The method you name has long been superseded by others.

SAL VOLAT.—We have not seen any portraits taken on parchment paper.

E. C. (Dublin.)—We will endeavour to obtain the information you require.

W. H. WALTER.—Send a good positive, not the negative.

J. W.—Your communication on "Copying" has never reached us.

J. CARTER.—The subject will be resumed in this journal very shortly.

J. M'K.—Use a quarter-inch diaphragm in front of the lens.

⁂ All editorial communications should be addressed to Messrs. CASSELL PETTER, and GALPIN, La Belle Sauvage Yard, London, E.C.

THE PHOTOGRAPHIC NEWS.

Vol. IV., No. 91.—*June* 1, 1860.

COLOUR IN ITS RELATION TO PHOTOGRAPHY.

BY CHARLES MARTEL.

Preliminary.—A work of art is the *representation* of an object. It is not, as frequently asserted, an *imitation*, for imitation is the lowest form of Art; the means and not the end. Art operates *by* imitation, but not *for* it, being the instrument of its conceptions, not the result or the limit. Nature, the source of every imitation, supplies the elements, but it is art that combines them. In nature these elements are vague, scattered, and confused; art selects and arranges them. Nature presents beauty in scattered fragments; art collects and assorts them. Nature consists of dumb and inert matter; art clothes it in thought, and gives it a language; idealises it.

Art is a representation. The sculptor does not imitate Milton, Newton, or Shakespeare, in his statue, he represents the form of the poet or philosopher, more or less idealised. Imitation is seen in wax figures, coloured and clothed as in life, but they are always repulsive to refined taste, and do not take rank as works of art. The artist, in painting a noble head, does not imitate the skin and hair, *that* would be impossible, but he represents them by the various resources of his art—light, shade, and colour. An imitation, strictly speaking, must, in form, texture, colour, &c., be so contrived, as to admit of its being mistaken for the original; for the object of imitation is to counterfeit, to deceive. If the aim of the artist in copying Nature were strict imitation, it would be as much as to say that the highest point we can attain in art, is to deceive the eye; but to deceive is one of the lowest aims. It is the neglect of this distinction that has led many modern artists into error and absurdity. The actor, who may be regarded as part of an animated pictorial representation, seeks to embody the characteristics of the part he assumes; thus presenting to the intelligent eye all the attributes of his original: in this case, the artistic effort is both an imitation and a representation.

A work of art is represented by form and colour: the sculptor employs only contour and relief; he expresses everything by form and nothing by colour. A statue, coloured in imitation of life, sinks at once to the level of wax-work. Colour, when applied to statuary by the ancients, was employed symbolically. If the sculptor's work be the product of genius, it may dispense with colour; everything the artist desires will be suggested to the observer without adventitious aids. The *Venus de Medici*, devoid of the delicate and fresh colours of nature, is beautiful, modest, and voluptuous. The *Laocoon* is white, yet it breathes, writhes, and suffers.

The painter accomplishes his representation by three means—outline, relief, and colour. But these three means may be, and are, virtually reduced to two—colour and relief—which gives outline, contour, and form. The representation of the form of a body may be effected by outline and relief, or light, shade, and chiar-oscuro. These two elements, of which the imitation of form is composed, differ in their nature, and also in their method, and must be considered apart.

The *outline* is that line which circumscribes and defines the space occupied by the object to be represented; traced on the paper or the canvas with the hand guided by the eye. For conveying the *idea* of an object, the outline is all-sufficient, and relief and colour may be dispensed with altogether. This fact is evident in the "outlines" of Flaxman, Retzsch, and Darley, which are as completely pictures, in the sense of pictures being representations, as though they were elaborated with all the resources of chiar-oscuro, and tinted with the most varied and glowing colours. So far as the communicating of the idea or thought in his subject is concerned, the painter cannot obtain a greater result by employing the most elaborate resources of his art. Still, however, outline cannot give the observer a complete idea of the form of a body with which he is not familiar: it does not express relief or projection. To represent all the variations of surface presented by certain objects, it is necessary to have recourse to light and shade, to represent *relief;* and in this process the outline becomes obliterated—absorbed in the touches required to represent this relief. But yet, of the three elements of imitation, outline, relief, and colour, outline is the most important and indispensable of all; for it is evident that, unless relief and colour were prescribed by outline, there could be no true representation of the forms of objects. Outline, therefore, is primary; relief, secondary; and colour, supplementary.

As an individual means of representation, Colour takes the lowest rank. It is of less importance than the other two, as it is nothing without them, although indispensably necessary to the complete imitation and representation of objects. Other arts beside sculpture dispense with colour, and are still adequate to the perfect representation of the artist's thought. In drawing in monochrome, as in sepia, Indian ink, in engravings, cartoons, and lastly, in photographs, the representation is effected by the delineation of form and not by colour.

It is a singular fact, that of the three means of representation, outline, the most excellent, is of the three the only conventional one. It does not exist at all in nature, and disappears altogether in the complete imitation. Outline is an aid—nothing more; a thing that exists only by convention. By it we express *contour*, the limits or boundaries of the space occupied by a given object, not only because this limit is so expressed in the model, but because we have no other means of expressing it. But however arbitrary and conventional it may be, its power is none the less real. It speaks most to our intelligence, because it artifically delineates that which in every object first strikes the attention. In looking at Flaxman's *Shield of Achilles*, for instance, before remarking its colour, or the relief of the chiselling that embellishes it, we have already observed whether it be round or square. Before examining the bright plumage of the bird, or the graceful roundness of its form, we have already noticed that it has but two feet, while some other animals have four. And this distinctive character—that first seized upon by the understanding—is not the relief, nor the colour, but the external contour, the outline, and it is all-sufficient.

Outline, therefore, is an artificial means of representation, but it responds so well to our intuitive method of observing, that of the three it is the one that most quickly makes things evident to our senses, and most spontaneously recalls them to the memory.

Colour is more in relation with the feelings than with the understanding, and that is the reason why it acts upon animals more than upon ourselves, because, although having similar feelings, they have not the same intelligence.

The painter, in representing form, proceeds to fill up the outline by shading certain parts with different degrees of intensity, and leaving other parts white. In this manner he produces the appearance of relief. The outline gives the profile, light and shade the salient points. By changing the point of view, every salient point may be seen in profile.

Perfect distribution of light and shade, with the mutual effect of the reflections upon each other, constitute simple chiar-oscuro. But in the representation of coloured objects we have not only to take into consideration the effect of light and shade, but also the complexities of the effect produced by differently-coloured reflections upon the local colour, and upon each other. Chiar-oscuro is, therefore, the most complex and difficult part of the painter's art: so difficult, in fact, that it is but very imperfectly studied by most modern painters. Without the aid of *chiar-oscuro*, art would be powerless to represent light.

In delineating all the delicate gradations and modifications of light and shade that constitute chiar-oscuro, photography stands preeminent. In the most carefully-finished drawing or engraving, a multitude of delicate effects of light and shade escape notice, or, if noticed, baffle imitation; and it is in this element of art that photography is so immeasurably superior to every other mode of representation. The absence of colour in photography is not so much to be regretted as at first sight may appear, seeing that the photograph gives us perfect outline and chiar-oscuro. If our attempt to show the relative value and importance of colour, as a means of representation, has been successful, the photographer will learn to appreciate the present resources of his art at their true value, and, when colour comes to be superadded to them, accept it gratefully, as the crowning glory of an art which, in its peculiar sphere, has, even now, no rival.

Colour is a word that has a much wider signification than the usual acceptation of that term. It consists of three elements: of *light*, which is the essence of colour; of *tint*, which indicates its hue or colorific quality; and of *tone*, which indicates its intensity—tint and shade. In a knowledge and appreciation of the due relation of the *tones* of colour, the genius of the colourist will be manifested.

The complexity of colouring over outline and relief has caused it to be regarded as the principal merit in painting, consequently, it is frequently cultivated at the expense of form, or outline and relief. The uneducated eye is sooner attracted by colour in a picture than by its other elements; and knowing this fact, artists, while studying, hasten to colouring before they have learned to draw well.

(*To be continued.*)

IRON-DEVELOPING AGENTS FOR NEGATIVES.

BY M. A. GAUDIN.

With many photographers, pyrogallic acid, as a developing agent for negatives, has become superseded by sulphate of iron. This result I had long foreseen and announced, having obtained the most varied and satisfactory results from the use of the proto-salts of iron. But, to obtain this result, I must say that the proto-nitrate and the proto-acetate of iron are very superior to the sulphate.

The sulphate of iron, without the addition of acid, reacts with so much violence upon the nitrate of silver, that it reduces the compounds of silver which have not been impressed by light: this is not the case with the nitrate and acetate of iron, except after the lapse of a very long time. The addition of a strong dose of acid, and the very great dilution of the sulphate of iron, are the means employed to reduce the energy of the reaction.

The nature of the acid added is not a matter of indifference; sulphuric acid reduces the silver to a much more decided crystalline state than acetic acid; consequently, it produces *whiter* direct positives. Acetic acid, on the contrary, produces positives with a yellow hue; but for negatives, acetic acid is preferable, because the images are finer, and more intense as transparencies, in consequence of a slower and more prolonged reaction.

The employment of acidulated sulphate of iron, with the sudden immersion of the exposed plate, is good only to obtain very weak instantaneous positives. This is so true, that, in proofs of this kind, the sky is always confounded with the mass of the proof, while in every respect their opacity will be, comparatively, very marked. In a word, the effect of this sulphate of iron thus prepared never exceeds a light grey by reflection, however long the exposure. By acidulating with acetic acid, the whites become yellow, but their intensity is more in relation with the duration of the exposure; consequently, the negatives are much more perfect.

In general, the action of the proto-salts of iron manifests itself in proportion to the union of several conditions, which are—that the silver impressed by light imbibes nitrate of silver in an almost concentrated state, to which a coating of acidulated sulphate of iron becomes added. In the case of the sulphate of iron acidulated by sulphuric acid in suitable quantity, no silver is precipitated upon the non-impressed iodide, but it produces some non-adherent silver, floating upon the whole surface of the plate. By the addition of acetic acid it produces scarcely any non-adherent silver, so that a much greater portion of silver solution goes to the formation of the image.

With baths formed of proto-nitrate and proto-acetate of iron, even without acid in excess, the contact of an exposed plate, covered with its layer of nitrate of silver, produces no image; the nitrate of silver has time to mix with the mass of the proto-salt before the reaction commences upon the impressed iodide; and at the moment this reaction is set up, the salt of silver is so diffused, that this reaction cannot establish itself, and no image is produced, however long the immersion be prolonged.

If, instead of immersing the exposed plate in a quantity of solution of proto-salt, we pour this proto-salt on to the plate, the effect is entirely different; the salt of silver is forced to remain with the ferric reducing agent an indefinite time, and the reaction cannot be avoided; but then we must dilute the salt of iron, in proportion as the reaction is energetic: this is why the sulphate of iron acidulated with sulphuric acid, but very diluted, reacts, in time, very nearly like pyrogallic acid. In these conditions the proto-nitrate and the proto-acetate of iron are very superior, the reaction is slower in manifesting itself, there is plenty of time to effect the mixture of the salt of silver with the proto-salt, and, as soon as the reaction is established, it continues with regularity, without veiling the image (fogging); we can obtain images of incredible power. I have said that the pictures do not *fog*. I have many times proved it by the fact that the strongest negatives are almost always brilliant and vigorous positives when developed with proto-nitrate of iron; the lights are of perfectly *mat* silver, and the blacks are well preserved, which is never the case with pyrogallic acid. With proto-acetate the silver is yellow, but the fineness of the picture is not a whit inferior to those obtained by using pyrogallic acid.

Therefore, negatives obtained by the proto-salts of iron—nitrate and acetate—are much preferable to those with sulphate. We have next to consider their mode of preparation.

(*To be continued.*)

PHOTOGRAPHY AND ITS APPLICATIONS.*

The upper floor is divided into three portions:—Two dark rooms for sensitising and developing the negatives, the large room for the cameras. The dark rooms are formed by wooden panelling, interior to the glass and iron. A balcony runs round the whole building on a level with the first floor, the railing of which serves as a support for the printing frames throughout the day.

The ground-floor is divided into an entrance-hall, into which the other rooms open. They are the collection rooms or office, in which plans not in use and the photographic prints are placed; the washing room, for glass plates and prints; and a room for preparing the sensitive paper, and for toning prints. There are also cellars under the ground-floor, in which the chemicals can be kept cool and in the dark. They are entered by trap doors in the floor.

The stands consist each of a centre and two side pieces.

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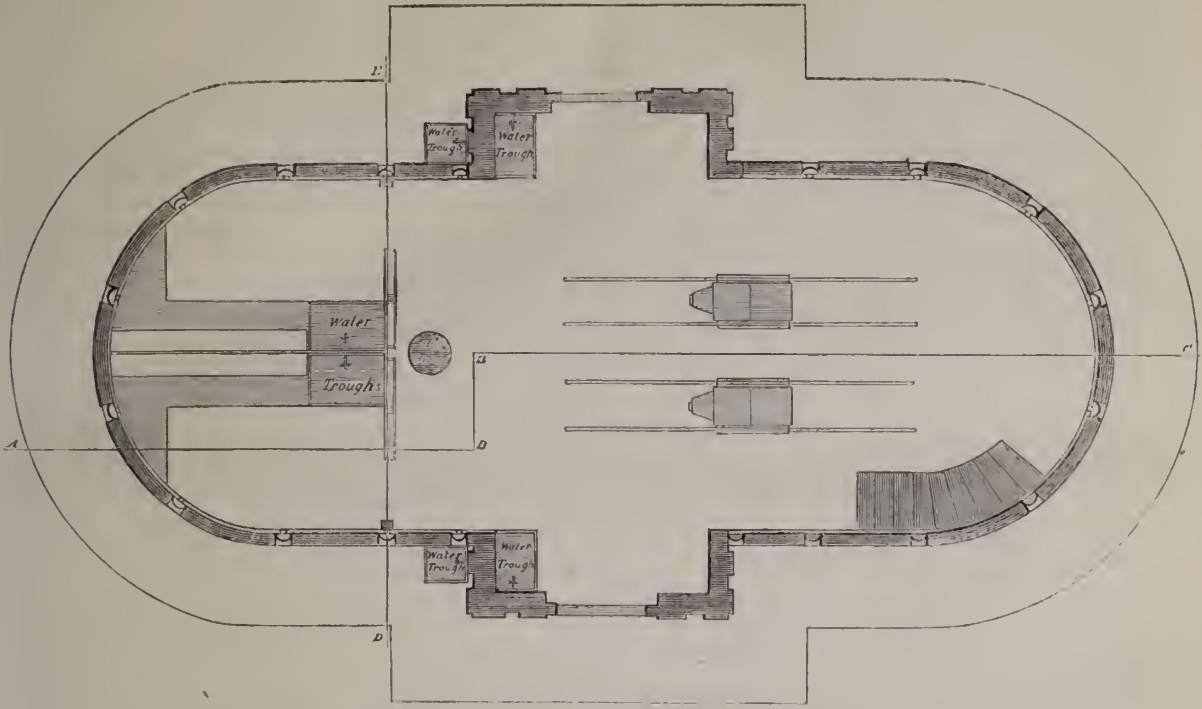
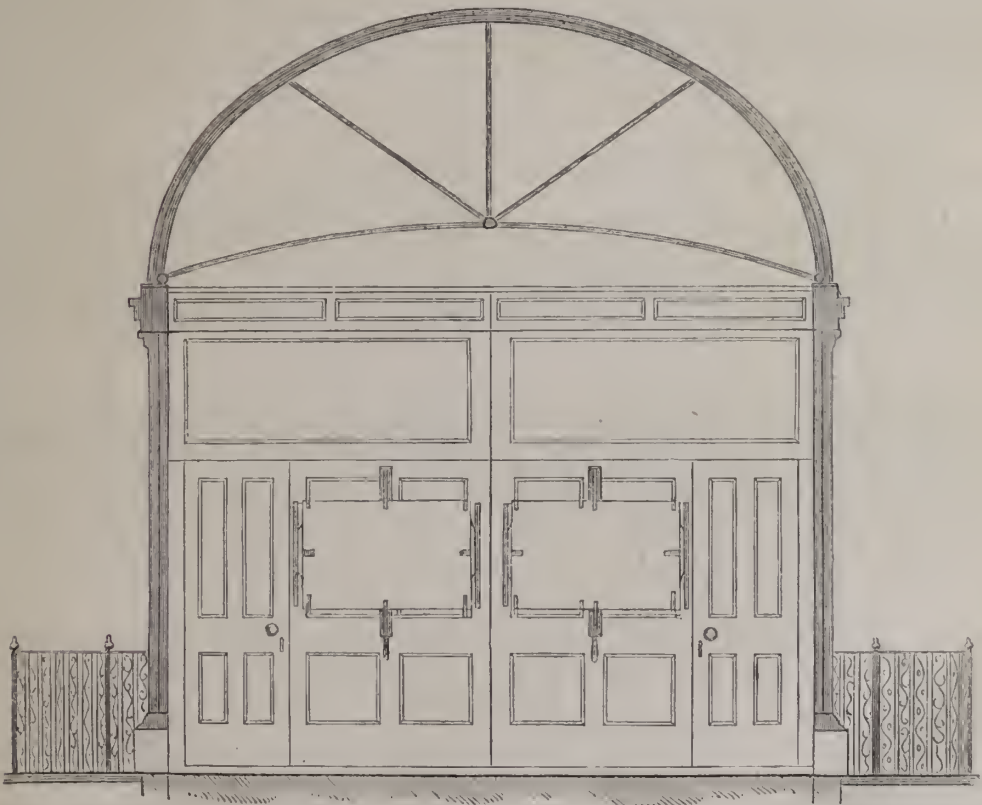
* Concluded from vol. iv. p. 39.



Ground Plan of the Upper Floor of the Photographic Building.



Section of Upper Floor of Photographic Building on the Line marked D E of the Ground Plan, showing the Arrangement of the Plan Boards.

The centre portion is composed of a frame screwed to the partition, with projecting sockets, in which the screw, worked by the handle shown in the centre, works. The board is provided with spring catches, by which the plans are attached to it.

The interior arrangements will be best described by tracing the progress of the negative and positive proofs in their course through the building.

The glass plates for the photographers are cleaned in the washing room, then collodionised and sensitised in the dark rooms on the first floor, exposed in the camera in the photographing room, again taken into the same dark rooms, and there developed and fixed. They are next immersed in troughs containing the corrosive sublimate, which are placed in the larger troughs on each side of the photographic room, in which troughs they are afterwards washed. They are then taken to the troughs (outside on the balcony) and washed with hydrosulphuret of ammonia, and again with water. The disagreeable smell of the hydrosulphuret of ammonia makes this out-of-door arrangement necessary. The plates are then placed on edge in a long, narrow trough, with a false bottom pierced with holes to drain them in. These troughs are placed on the plinth which supports the columns of the photographic room, and, when the plates are dry, they are varnished.

The paper for printing is made sensitive in the lower dark room. This paper is placed in contact with the negative photographs in the printing frames. The printing frames fit into supports of a very simple construction, by which they can be readily attached to the top rail of the balcony. The frames can thus be exposed to the light in the most favourable position by simply shifting the position of the supports as the day advances, and also by regulating the inclination of the frames to the elevation of the sun. When the print has been sufficiently exposed, it is removed to the lower dark room, where it is subjected to the fixing and toning process; it is finally placed in the washing apparatus in the washing room. Each trough is provided with a supply-pipe for water, and necessarily with a waste-pipe.

Gas is conveyed into each room, and in winter is used for heating as well as lighting purposes.

SCIENTIFIC GOSSIP.

It has frequently been noticed that gun cotton, when kept for some time, is liable to decompose spontaneously; but we are not aware that this phenomenon has ever been the subject of careful examination by any experienced chemist. Lately a case of this kind has come under the notice of Dr. Hofmann, who has carefully examined the subject, and with somewhat curious results. The cotton had been prepared in the establishment of Messrs. Hall, soon after Schönbein's discovery, and had been taken out of a cartridge intended for blasting purposes, and preserved since 1847 in a glass-stoppered bottle; after some time, red vapours had appeared in the interior of the bottle, and the bottle had crumbled down to a loose powder. When Dr. Hofmann had lately an opportunity of examining the bottle, the powder was found to be converted into a light brown, semi-fluid, gum-like mass, while the sides of the bottle had become coated with a net-work of fine needles. It was not difficult to collect a sufficient quantity of these crystals to submit them to chemical analysis, and, upon examination, they proved to be pure oxalic acid. The viscid mass, into which the bulk of the gun cotton had been converted, exhibited all the properties of ordinary gum; it was likewise interspersed with crystals of oxalic acid. This decomposition is very curious, but it is no more than might have been expected, when we consider the large amount of oxidising agent present in gun cotton, and that oxalic acid is one of the most frequent products of the action of such agents upon organic matters. Our readers will doubtless recall to mind the experiments of Mr. John Williams, which we published some months ago, whereby large quantities of oxalic acid were shown to be present in the residues of the solution of gun cotton in ether during the manufacture of collodion.

Mr. Maxwell-Lyte, one of our most esteemed correspondents, has pointed out a circumstance which may serve as an explanation of many positives being spoiled in the fixing bath. He states that the solvent properties of hyposulphite of soda on chloride of silver are materially diminished by cold. In a solution of hypo. at the ordinary temperature of the air (60° Fahr.), the chloride of silver will be dissolved freely from the positive print, but when the temperature diminishes to near the freezing point, the chloride of silver no longer dissolves, but merely becomes converted into hyposulphite of silver, which, being a very unstable salt, soon decomposes into sulphide of silver, and produces that appearance with which all photographers who have done much in positive printing are acquainted. The picture, on being looked at as a transparency, appears completely buried in a dirty-yellow opaque precipitate, which gradually turns slate coloured, and resists all attempts at removal, by washing or otherwise. The remedy for this, according to Mr. Lyte (and our own experience corroborates his), is to keep the fixing bath at a temperature of 60° or 70°, and never allow it to fall much below that temperature.

POSITIVE PRINTING WITH GALLATE OF IRON.

BY M. POITEVIN.

In photographic printing with gallate of iron, I prepare the paper with a mixture of equal measures of solutions (10 per cent.) of perchloride of iron and nitrate of uranium. This nitrate is very quickly reduced under the influence of light, in presence of organic matters, and then it reacts upon the perchloride of iron, which passing into the state of protochloride, does not become black by the action of tannic, gallic, or pyrogallic acids. Perchloride of iron, applied alone upon paper, is also reduced by light, but much more slowly. The salt of uranium may be advantageously replaced by other substances, such as glycerine, oxalate of ammonia, and tartaric acid; the last, especially, gives very satisfactory results.

Make a solution of one drachm of perchloride of iron in ten drachms of water, to which add 20 grains of tartaric acid. Float the paper on this solution, and allow it to dry spontaneously; but, before using it, it should be thoroughly dried with a gentle heat. The paper thus prepared is of a deep yellow colour; when it is dry, it very quickly becomes entirely bleached in the light. To obtain a print from a glass *positive*, an exposure of ten or twelve minutes in the sun will suffice: the bleaching of the paper will serve as a guide. To facilitate, or rather to accelerate the printing, I add to the solution of perchloride of iron and tartaric acid some sulphocyanide of potassium in sufficient quantity for the paper, re-covered with this new mixture, to become of a blood-red colour, after becoming dry. During the printing, this red colour disappears proportionally to the quantity of light which passes through the negative, at the same time the persalt of iron is reduced, and a red image upon a white ground is obtained. This red colour is, however, not permanent; it disappears in the course of a few days, even when the prepared paper is kept in the dark. To render the picture thus obtained of an inky blackness, and also permanent, I wash it quickly in ordinary water, or preferably in water containing chalk in suspension. The red colour disappears; the greater part of the protochloride of iron which is formed disappears, and sesquioxide of iron is formed in the parts not acted upon by the light. The proof is then immersed in a solution of gallic acid, to which a little tannin is added. The image gradually appears of an inky black colour, and, when it has become sufficiently intense, it is washed in rain or distilled water, placed between sheets of blotting paper, and left to dry. The fixing is now complete and permanent.

If, instead of immersing the proof in the solution of gallic acid, it is placed in a weak solution of ferrid-cyanide of potassium (red prussiate of potash), then prussian blue is formed in the places where the light has reduced the perchloride, and in this manner we may obtain from a *cliché* a positive blue image on a white ground. We can also change the proofs into blue, by immersing them in water slightly acidulated with sulphuric acid, to which a few drops of ferro-cyanide of potassium (yellow prussiate of potash) are added.

I have also remarked, that certain papers prepared with perchloride of iron and tartaric acid become impermeable to water when dry, and that they become so in the pressure frame under those parts of the negative, which allow the light to pass through. If, then, upon taking the proof out of the pressure frame, it is floated on a dish of gum water, the liquid will only penetrate the solarised parts, and form a kind of varnish on the parts covered with the image. We can then apply with a tuft of cotton dry powders, either of carbon, or mineral, or vegetable colours, which only adhere to those parts upon which light has acted. If, instead of dry powders, we apply a printing ink, which can also be applied with a pad or roller, the ink will attach itself only to those places not moistened; in this way, we have the means of transferring the photographic picture to stone, wood, metal, ivory, &c.

In conclusion, I think it necessary to remark, that I have found papers strongly sized with starch the best suited for printing with gallate of iron.

Woollen or cotton fabrics can also be printed by this process.

Designs upon paper may be obtained in black, from glass positives, and in blue from negatives.

APPLICATION OF PHOTOGRAPHY TO PHYSICAL GEOGRAPHY AND GEOLOGY.*

BY M. A. CIVIALE.

An abstract of the following paper was given in the letter of our Paris correspondent last week; but the subject is so important, that we publish the entire paper, in order that some particulars not alluded to by our correspondent may be brought before our readers:—

Mountainous countries have furnished photographers with a great many landscapes, interesting both in a picturesque and artistic point of view; but few have hitherto occupied themselves with the advantages that geology and physical geography may derive from photographic pictures taken under clearly-defined conditions.

MM. Elie de Beaumont and Regnault first called my attention to this subject: it is in accordance with the instructions they gave me, that, last year, I took in the Bernais Oberland the series of photographic pictures which I have the honour to present to the Academy.

I shall briefly describe the apparatus I made use of, the photographic process, and the method employed in taking the views. The apparatus was a very portable bellows-camera, mounted upon four legs, and possessing very great stability. The lens, double combination. The focus for infinite distances, was 28 inches; the image produced on the ground glass, measured 15 inches by 11 inches; a spirit-level, compass, and goniometer,† completed the apparatus.

The negatives were taken on dry waxed-paper, iodised in a bath of cerolein; the time of exposure varied from seventeen to nineteen minutes during the latter part of July and the month of August.

For views formed of a single sheet, it suffices to indicate the direction of the optical axis of the camera, and the vertical angle it makes with the horizon, if the inclination of the ground and the proximity of the view to be taken does not permit its being maintained in a horizontal position. In panoramas it is indispensable, in the joining of the proofs, for the camera to be placed in a horizontal position; the instrument turns on its axis, so as to permit the first sheet to cover the second about the eighth of an inch, and the same with the succeeding sheets.

The station-point must be indicated, and the height above the level of the sea, as well as the direction of the optical axis for each proof, or, at least, for the two extreme sheets. By consulting a map of the country, on a large scale, we can find the distance of the station from any point in every sheet composing the panorama. The horizontal angle—within which the whole view is comprised—may also be ascertained; and, with the aid of the goniometer, the vertical angles are taken which every summit forms above the station-point, to determine afterwards their relative height from below this point.

These indications are necessary, in order to render the photographic proofs useful for scientific purposes.

The proofs forming panoramas—which I exhibited to the Academy, with an album of details—were taken chiefly in the eastern part of the Bernais Oberland, where the upheaving appears to have been greatest.

The panoramas taken from the Faulhorn and from the Lidelhorn exhibit the whole chain.

A panorama taken from a hill behind the church of the Grindelwald represents the valley, the lower portion of the mountains, and the two glaciers.

The last panorama, taken from the Wengernalp, about 700 feet west-north-west of the hotel of the Jungfrau, represents a portion of the Eiger and the Minch, the Jungfrau and Lidelhorn.

The views of the details have been taken in the valley of the Grindelwald, and upon the route from Handeck to Grimsel; they represent the mountains and glaciers of the valley, the polished and rounded rocks, the course of the Aar and its glaciers, the glacier of the Rhone, as well as the panoramas on a reduced scale.

I have added to the album some proofs of snow taken in Oberland, in the month of February last. I perceive that the forms of the mountains are better defined at this period of the year than during summer.

[M. Elie de Beaumont drew the attention of the Academy to the truthful character presented by the various panoramas, and to the precision with which certain details, very difficult to render with the pencil, were represented, particularly the various accidents of the glaciers, the polished and rounded surfaces of the environs of Grimsel and of the glaciers of the Aar, the bold escarpments of the mountains of the valley of the Grindelwald, &c.]

Dictionary of Photography.

Nickel.—A greyish white metal, of a density of about 8·8. It is almost as magnetic as iron, but loses this property when heated to 750°F. It does not undergo any alteration in a moist atmosphere, but, when heated in the air, it is converted into oxide. It dissolves in diluted sulphuric acid and in hydrochloric acid, evolving hydrogen. Alloyed with copper, it forms *German silver* and similar compounds. The salts of nickel, when hydrated, are of a fine green colour; most of them become yellow upon losing their water of crystalisation. Their solutions are of a fine emerald-green colour. Iodide and bromide of nickel are said to have been used in photographic collodion with good results.

Nitrogen.—A colourless gas, without taste or smell. Its specific gravity is a little less than that of atmospheric air, being 0·9713. It is not inflammable, nor will it support combustion or respiration. It constitutes four-fifths of the air we breathe; water dissolves a very small quantity of it, about $\frac{25}{1000}$ths. One volume of nitrogen combines with three volumes of hydrogen to form ammoniacal gas. The combinations of nitrogen with oxygen are of very great importance, particularly *nitric acid*, (*q. v.*) in which the proportions of oxygen to nitrogen are as 5 to 1. Protoxide of nitrogen is known as *laughing gas*. The equivalent of nitrogen is 14. This gas has not yet been liquefied under any pressure.

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* Read before the Paris Academy of Sciences.

† The goniometer is a little instrument constructed for determining horizontal and vertical angles. It consists of a wooden support furnished with a spirit level, a lens with vernier, of an arc of a circle of 90°, bending in an opposite direction to the lens, and of two pinules under the wooden support. A full description of this instrument, and of M. Civiale's apparatus and process, will be given in an early number.

Nitrous Acid.—An acid composed of one equivalent of nitrogen and three equivalents of oxygen, or two atoms less of oxygen than is contained in nitric acid. It may be obtained by the decomposition of hyponitric acid, or by the mixture, in proper proportions, of dry binoxide of nitrogen and oxygen gases. At the temperature of zero, they condense into a clear blue liquid, which is nitrous acid. This acid is also formed frequently when nitric acid is made to act upon organic matters, such as starch; but in such cases it is always mixed with a large quantity of hyponitric acid. It is very difficult to obtain this acid in a state of purity, it being impossible to distil it without decomposition, for it is changed into binoxide of nitrogen, which is given off, and hyponitric acid, which remains in the retort. It is extremely volatile; it boils at 32°F. It may be mixed with water at that temperature, but it is decomposed immediately the temperature is raised. Nitrous acid, in combination with the bases, forms *nitrites*. Its equivalent is 38.

(*To be continued.*)

A Catechism of Chemistry.

CHEMICAL AFFINITY—(*continued*).

Q. Do bodies which have united together by virtue of the force of chemical affinity retain any resemblance to their former appearance in the resulting compound?

A. Generally speaking, there is an entire change of properties, and one which it would be impossible to predict by any *à priori* reasoning.

Q. Mention has been made of common salt being composed of the two elements—chlorine and sodium. In what respect do the physical properties of the constituents differ from those of the resulting compound?

A. Chlorine is a heavy, yellow-coloured gas of a powerful, suffocating odour when diluted with large quantities of air, and instantly fatal when inhaled in the pure state. It attacks and destroys most kinds of organic matter, and is possessed of very intense affinities for most of the other elements.

Q. What is sodium like?

A. Sodium is a very light, metallic body, resembling polished silver when pure, but rapidly absorbing oxygen from the air, and becoming tarnished with a film of yellow oxide. When thrown into water it floats on it, and decomposes it with violence; not unfrequently evolving so much heat as to cause the ignition of the liberated hydrogen.

Q. How can these two active bodies unite and form the inert body, common salt?

A. The properties of each substance, although extremely energetic, are of such an opposite character, as to entirely destroy or neutralise each other; and their violent affinities—being thus pre-occupied in keeping each other within bounds—are kept in a latent state.

Q. The affinities of chlorine and of sodium must, therefore, be exactly equal, or they would not balance each other in so perfect a manner. Is this the case with every substance?

A. Every element exercises its chemical affinity with a different degree of force, which is, however, always constant for the same body. Thus, when two elements of opposite characters unite to neutralise each other, they do not unite in equal quantities, by bulk or weight, but in such proportions that the *affinities* of each are equal.

Q. In what proportions, then, do chlorine and sodium unite to form common salt?

A. The affinity of chlorine may be represented by the number 35½, and that of sodium by the number 32. When they unite together, therefore, 35½ parts, by weight, of chlorine unite with 32 parts, by weight, of sodium, and produce 67½ parts of salt.

Q. Are there certain numbers, like the above, which express the amount of chemical affinity possessed by every element?

A. Yes; they have been the subject of a vast number of experimental inquiries on the part of the most eminent chemists, and at present the *proportion* or *equivalent* of *combining* almost every element has been determined with a very great degree of accuracy.

Q. Is there any outward manifestation of action between bodies when they unite by means of chemical affinity?

A. Yes. As a general rule, the temperature rises, and this in proportion to the violence of the action. When sulphuric acid is mixed with water, the liquid becomes heated to the boiling point, showing the great affinity existing between sulphuric acid and water. When a candle or a fire is lighted, the light and heat are solely due to the intense chemical affinity between the oxygen of the air and the carbon and hydrogen of the combustible substance.

Q. Have compound bodies any chemical affinity?

A. Yes; frequently they have as powerful affinities as the elementary bodies. Sulphur, for instance, has an affinity for oxygen, and is capable of uniting with it in several proportions, one of the compounds being sulphuric acid; but the affinity of this sulphuric acid for different bodies far surpasses any affinity which the sulphur possesses.

Q. Mention has been made that elements only unite in one definite proportion with other bodies. How, then, can sulphur unite with oxygen in several proportions?

A. Elements can not only unite in one proportion with each other, but also in multiples of that proportion. Thus, one *equivalent* of sulphur (represented by the number 16) unites with one equivalent of oxygen (the equivalent of oxygen being represented by the number 8), and also with two and three equivalents. Sulphur and oxygen also unite to form chemical compounds in the proportion of 2 to 5, 3 to 5, and 4 to 5.

Q. Have these compound bodies equivalent numbers?

A. Yes. The equivalent number of a compound body is the sum of the equivalents of its constituent elements; sulphuric acid—consisting of one of sulphur (= 16) and three of oxygen ($3 \times 8 = 24$)—has for its equivalent the number 40.

Q. What does sulphuric acid unite with?

A. Sulphuric acid belongs to that large class of bodies known under the name of *acids*, and it has a great affinity for the opposite class of bodies called *bases*.

Q. Mention a base with which sulphuric acid has an affinity.

A. Potash is a base which has a very powerful affinity for sulphuric acid.

Q. What is the composition and equivalent number of potash?

A. Potash is composed of the metal potassium and oxygen. The equivalent of potassium is 39; and that of oxygen being 8, the two unite in equal proportions to form the base, potash, the equivalent number for which is 47.

Q. Knowing, therefore, that the equivalent of sulphuric acid is 40, and that that of potash is 47, are we justified in anticipating that the two will unite together in these proportions?

A. Perfectly so; 40 parts of sulphuric acid unite with 47 parts of potash to form 87 parts of the body, sulphate of potash; a compound as neutral, and in which the energetic character of its constituents are as completely masked, as in the before-mentioned compound of chlorine and sodium—common salt—or, in chemical language, chloride of sodium.

(*To be continued.*)

The Amateur Mechanic.

METALS.

In addition to the methods of joining metals by means of soldering, it will be necessary for the amateur to have some knowledge of the right methods of drilling and riveting. For the convenient performance of these operations, it will be necessary to possess a small vice, to attach to a bench or table. On the side of the vice is usually a small hole, to serve as a rest for the end of the drill when it is in use. The drills may either be fashioned by the amateur himself, or they may be purchased ready for use at the tool shops. If the manipulator wish to make a drill himself, he must procure a piece of steel wire of the requisite thickness: the end of this must be softened by holding it in the flame of gas or a lamp, and then beaten with a small hammer upon the vice, to a flat shape, and finally, filed to a lozenge point. It is then to be hardened again by heating, until it is red hot, and then suddenly cooled by plunging in water or oil.

For use, the drill is fixed in a stock, something similar in shape to a common cotton reel. The sharpened point of the drill being dipped in oil, is placed against the metal through which the hole is to be drilled, which is held in the left hand, whilst the opposite end rests in the hole at the side of the vice. A rapid rotatory motion is then given to the drill by means of a "drill-bow," which is held in the right hand. The "drill-bow" consists of a piece of whalebone or cane, bent into the shape of a bow with a string of cat-gut. This string is twisted once round the stock, and by rapidly moving it backwards and forwards, the necessary boring motion is communicated to the drill. The lozenge-shaped point being a little broader than the thickness of the wire of which the drill is formed, clears its way readily. The point must always be kept supplied with oil to lessen the friction.

In joining metals by means of rivets, to secure neatness and strength, it is somewhat important to adopt a right method. A small hole having been drilled by a tool of the right size—the judgment of the manipulator must determine this, large enough for the strength of the rivet, and not so large as to weaken the metals to be joined—the hole is to be opened a little at one end by means of a "broach," a steel tool with five sides, tapering towards the point. The other, or small aperture of the drill hole is opened a little into a cup shape, by what is termed a "chamfering-tool;" so that the end of the rivet may be counter-sunk. A piece of wire, either brass or iron will do, of the right size, is then to be filed to a tapering point, to fit the hole; it is then to be driven in until it fit tight. The projecting portions of wire being removed by means of the cutting pliers, the thick end of the rivet is placed upon the vice, or any solid metal rest, and the small end gently tapped with the thin end of a small hammer until it is sufficiently spread or flattened out to fill the counter-sunk orifice. The rivet may then be filed smoothly off at each end, and will be quite firm and neat, the wedge-like shape preventing it from working loose one way, and the counter-sunk end holding it equally firm the other. We may remark that, in describing the modes adopted by the skilled artisan, we here, as in many other cases, intend the description to be chiefly suggestive to the amateur, who will be able to effect the same ends by the facilities at his disposal.

Of constantly recurring importance to the amateur mechanic is the ability to produce metallic screws for various purposes. Screw-plates, with corresponding "taps" of various sizes, may be had at the tool shops. Perhaps a couple of sizes, one graduated for large and the other for small screws, will be sufficient for most purposes. Copper or brass will be found the most valuable for the purpose of the amateur in producing nuts and screws, as being sufficiently strong and durable for many purposes, and very easy to work. A piece of copper wire, rather larger in diameter than the size of the screw to be made, having been selected, it must be annealed by heating to redness in the flame of a lamp or of gas. It should be a little longer than the screw required, and should be perfectly straight. The end on which it is intended to commence should be filed a little tapering, so as to allow it to enter the aperture in the screw plate. It is customary to commence with an aperture one size larger than the screw intended to be formed. The wire is now to be fixed in the jaws of the vice, so as to allow about an inch of the wire to stand above the surface of the vice in a vertical position. The wire being greased with tallow or oil (the former is best), the hole in the screw-plate, one size larger than is intended in the finished screw, is placed over the wire in a perfectly horizontal position, and slowly rotated with a slight downward pressure until the plate has reached the vice. If the wire be of the right thickness, a rough screw will be thus produced with the exercise of but little pressure. This rough screw is now to be passed through the next aperture, so as to acquire the proper size. Greater pressure must be used this time; and also very great care to avoid breaking the screw in the plate, in which case it would require to be drilled out, and a fresh beginning made. The wire must be kept well greased, and the plate rotated slowly and carefully, not with a steady, progressive movement, but backwards and forwards every two or three turns. Copper being soft, will require care, to avoid the risk of breaking it in the process of forming the screw. A few failures must be expected in commencing this operation, but, with care, excellent screws may soon be formed with facility.

Nuts for these screws may be formed of sheet copper. A hole is first to be drilled a little smaller than the size of the screw; and the "tap," of the right size, steadily worked in until a female screw of the required aperture is formed.

The hints we have given will be, for the most part, sufficiently suggestive, to enable the amateur to conduct the various processes he will require in the working and joining of metals, his own judgment and ingenuity directing the application of our suggestions to his own specific purposes.

It is no part of our purpose to enter into the various methods of finishing and polishing work in metals: we may, however, suggest, that for many purposes the simple process of lacquering will be found the best finish to articles in metal, as protecting them from oxidisation by the action of the atmosphere. The article to be lacquered having been rendered sufficiently smooth and polished, may be coated with any good varnish; lac varnishes, which are hardest, answer best. It is customary, however, to add colouring matter to the varnish, to give it a golden hue; the coloured gums or resins, such as dragon's blood and gamboge, being chiefly used. Various formulæ are used for preparing the lacquer, depending on the colour required. The following proportions will give a lacquer of a very brilliant colour: of shellac, gamboge, and dragon's blood, each one ounce, dissolved by the aid of heat in eight ounces of alcohol—methylated spirit will answer the purpose perfectly well. By increasing the proportion of shellac, and decreasing that of the gamboge and dragon's blood, a harder lacquer, but less brilliant in colour, will be obtained. In applying this, the article should be kept near the fire, or the lacquer will be apt to chill and dry without lustre.

For blackening the metal work of lenses, lampblack added to a spirit varnish, and applied without heat, will be found to answer best; as it dries quite dead, it is not easily scratched off. About three ounces of shellac dissolved by the aid of heat in a pint of methylated spirits, and lampblack enough to obtain the blackness required, will be found about the right proportions.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 28th May, 1860.

I learn that in Germany collodion has been applied to a very useful purpose, that of preserving pencil-drawings, &c. When mixed with four parts of ether, collodion forms a very liquid compound, which soon evaporates from a sheet of paper, leaving upon it a transparent layer that in no way disturbs the neatness of the drawing, whilst it preserves the latter from damp, from friction, and other agents of destruction. This mode of preservation does not prevent the artist adding anything to the drawing after it has been thus covered with collodion; but, to protect any such additions, another layer of collodion is, of course, necessary. A wide and very soft brush is employed to spread the liquid uniformly over the drawing.

M. Barbet has invented the following method for obtaining pure silver and nitrate of silver from the chloride of that metal:—The chloride of silver, mixed with a certain quantity of water, is placed in a pouch formed of the bottom part of a bladder, or of a sheet of parchment. The centre of this bag is pierced by a needle, so as to give passage to a platinum or silver wire, which, at its extremity, is wound round a small piece of silver, or a silver spoon, plunging into the chloride. The pouch is placed in a porcelain vessel containing some fragments of zinc, upon which diluted sulphuric acid is poured. A sort of battery is thus formed; hydrogen is evolved from the metallic wire throughout its whole length, both above and beneath the bladder, and the chloride of silver is soon reduced to the metallic state. The spongy metal thus obtained is washed and melted; or simply well washed, and dissolved in nitric acid to form the nitrate.

Concerning the crystallisation of nitrate of silver, M. Barbet says, that this salt can be obtained neutral, and in very large crystals, by dissolving it, after fusion, in its own weight of distilled water, and placing the solution under a bell glass, over a layer of quicklime, or a bath of concentrated sulphuric acid. In a few days, all the liquid will have disappeared, and be replaced by enormous rhombohedron crystals, perfectly white and transparent; according to the author, they are anhydrous, and do not appear to be affected by day-light.

It may be useful to photographers to possess an easy method of discovering small quantities of iodine in nitric acid. One of the best processes was discovered some months ago by M. Stein. It consists in plunging a piece of tin into a small quantity of the acid it is wished to test; as soon as nitrous vapours show themselves, the tin rod is withdrawn, and a few drops of sulphide of carbon are added to the liquid. The whole is shaken up; in a few instants the separated drops of sulphide unite together again. They are seen to be coloured red, if iodine is present, and the intensity of this colour is more or less prominent according to the quantity of the latter.

In May, 1857, my esteemed friend, M. Goldschmidt, to whom the discovery of so many new planets is due, saw, for the first time, a new variable star of the 7th magnitude. This star having afterwards disappeared, M. Goldschmidt looked in vain for its reapparition. At the commencement of May, 1859, he saw, at the star's place, only a very feeble luminosity, scarcely perceptible. On the 6th of the month, however, the star reappeared, but was seen only as one of the 12th magnitude. I should like to know what is to be seen of this star in May, 1860; but M. Goldschmidt is out of town. It is not, however, difficult to find when visible, its right ascension being about 13h. 20m. 95s., and its declination, 2° 25′ 5″. The other stars in that region of the heavens are very slightly luminous, being scarcely of the 12th or 13th magnitude.

The *Moniteur Scientifique* of Paris publishes a short note by M. Golowkinsky, showing that when chlorobenzol, mixed with oil of naphtha, is acted upon by oxalate of silver, essence of bitter almonds is produced. If the naphtha is not present, the mutual action of these two compounds is too violent, and they are completely decomposed.

Baron von Liebig has lately published a paper upon the transformation of cyanogen into oxamide. He found that if to water saturated with cyanogen, a certain quantity of aldehyde were added, crystalline crusts of oxamide were sooner or later deposited. The aqueous liquor was saturated consecutively three times with cyanogen, but did not appear to lose its power of depositing oxamide. The liquid, after the latter substance was separated, acted as if it contained a combination of oxamide and aldehyde, which was decomposed on boiling. In fact, when boiled, aldehyde distils but very slowly, whilst crystals of oxamide are precipitated, and the filtered liquid gave, after evaporation, a crystalline residue of oxalate of ammonia.

Like all researches in organic chemistry, this experiment has given rise to a number of other products which M. Liebig proposes to examine.

Some writers upon chemistry, who can do nothing more than invent mysterious and useless groups of formulæ, and whom the ever-illustrious Berzelius used to denominate "cabinet chemists," have endeavoured to prove *verbally* that monobasic phosphoric acid contains a radical PhO_4; if such were the case, says an experienced chemist, M. Lautemann, we should obtain the chloride PhO_4Cl. But, when anhydrous phosphoric acid and chloride of sodium are heated together in a retort—the chloride of sodium having been previously melted and pulverised—no such product is obtained, but simply the oxy-chloride of phosphorus, $PhCl_3O_2$, which distils over into the recipient. In making this experiment, M. Lautemann remarked, that anhydrous phosphoric acid is more volatile than is generally admitted, and that it can be almost completely sublimated in a glass tube, by the flame of a spirit lamp.

M. Elie de Beaumont has lately drawn the attention of our Academy of Sciences to the numerous volcanic phenomena, earthquakes, eruptions, &c., that have been noticed within the last few months. He brings forward an account of a violent eruption of the volcano on the island of Bourbon, which happened on the 20th of March last. On the 19th, at half-past eight in the evening, a terrible subterraneous thunder was heard; the ground was perceptibly vibrating, though no actual earthquake took place. Soon after the volcano evolved an immense column of grey smoke more than 100 yards wide at its basis. It was accompanied by large red-hot pieces of rock, which were projected into the air, and fell round about the mountain. The grey smoke divided into two enormous storm-clouds, furrowed in all directions by lightning; it soon fell as a rain of ashes, covering the greater part of the island. From a calculation made by a M. Hugolin, the volcano must have thrown up six hundred millions of pounds of ashes in the space of a few instants. An hour after, the eruption was all calm again.

M. Elie de Beaumont next read part of a letter from M. Prost, of Nice, showing that towards the end of April an eruption of Vesuvius having been spoken of in the papers, M. Prost was struck with the frequent oscillations of the earth about that period, more especially intense, says he, from the 30th of March to the 1st and 2nd of May. M. Prost judges of the intensity of these vibrations of the ground by the manner in which they put in motion the crystals of the chandelier which hangs in his drawing-room. An ordinary observer would probably not notice them.

We have also in the *Moniteur* of the 14th of May an account of an earthquake which took place on the 8th of April, in the town of St. Marc (St. Domingo). Many houses were knocked down, and much damage done. The shocks, though slight, were felt up to the 12th of April. It appears also that some shocks of an earthquake were likewise felt at the island of Jamaica.

ALBUMEN DRY PROCESS.

To the Editor of the "PHOTOGRAPHIC NEWS."

DEAR SIR,—In compliance with your wish, I venture to give you the following hints, and, by so doing, desire, if possible, to raise a discussion about a too much neglected process, rather than appear as an instructor.—Yours truly,

JAMES ARCHER.

Strutt Street, Manchester, May 15th, 1860.

In face of the many "dry processes," at present practised, it certainly appears superfluous to discuss another; but all those now fashionable require collodion, which has several disadvantages. It is at all times expensive, and often uncertain in composition and keeping properties; in addition to which, is the injurious fume of ether, while inhaled in a close room.

The process I have adopted to avoid these evils is a modification of Whipple's albumen, the one described by Mr. Coale, of America, whose excellent little manual on the subject should be more extensively known.

The various manipulations are as follow:—

1. *Preparation of the albumen*, supposing six ounces are required.

Into a convenient vessel, say a small bowl with a lip, pour the whites of four large fresh eggs, which will give about four ounces of albumen. Then dissolve, in two drachms of clean water—

Iodide of ammonium	48 grains.
Bromide of ammonium	20 ,,

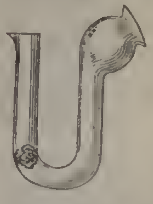
When quite dissolved, add it to the albumen; and lastly, add two ounces of syrup, made as presently described. Then beat up the whole to a *stiff froth*, by any of the known approved methods, and put it aside for twelve hours, that the clear albumen may settle to the bottom: the frothy surface will protect it from dust, but it is as well to cover it with a plate.

It must then be put away in the stock bottle, with a lump of camphor, where it will "keep" a considerable time.

I have found it as good at the end of a month as when freshly made.

The syrup is made thus:—

Dissolve a pound of lump sugar in half-a-pint of clean water, heat it over a fire to the boiling point, and then instantly remove it.



When the albumen is wanted for use, filter it through a piece of *perfectly clean* sponge, pressed lightly into the neck of a glass funnel, or, better still, through an albumen filter, like this.

The sponge is pushed down to the bend, and the liquid being poured into the open bulb, rises up through it into the straight tube. Thus all risk of air bubbles, the great enemy of this process, is avoided.

To prepare the plates, I always employ "Chance's flatted crown" glass, which answers quite as well as the patent plate, and at one-half its cost. Having well cleaned them the previous day, to avoid raising dust, they must be reared on a clean shelf in a cupboard, with the smoothest side of each piece nearest the wall.

When ready, pour about two ounces of albumen (for a 9 × 7 plate) into the bulb of the filter, and attach a pneumatic holder to one of the plates; then, holding the lip of the filter as near the surface of the glass as possible, pour the albumen on, until a pool, about five inches diameter, is formed in the centre of the plate, and alternately raise each corner until it has flowed over the whole surface. Now tilt it slowly and allow the albumen to run off at one corner into a glass measure, to be poured back into the filter. When it begins to drip rather slowly, in about six seconds, wipe the lower edge on a damp sponge, and return the plate to a horizontal position for half a minute, to allow the film to equalise itself. Then, having detached the holder, take the plate by opposite corners with the finger and thumb of each hand and pass it backwards and forwards over the flame of a spirit lamp, or (better) aerated gas burner, the flame being in contact with the back of the plate. Begin with the corner opposite that from which the albumen was poured, and, after moving it a short time, drain it from the same corner again, and wipe the edge on the sponge. Now pass it again over the flame until the lower edge can be touched with the finger without sticking. Then set it upright, face to the wall, resting against the corner only, and proceed in a similar way with the next plate.

When this is brought to the same stage as the other, take up the first plate again, and having passed it a few times over the lamp, immerse it, while warm, but not too hot, in the following nitrate bath:—

Nitrate of silver	45 grains.
Water	1 ounce.
Glacial acetic acid	1 drachm.

Allow it to remain 30 seconds, but a minute will not injure it. It must then be well washed, to remove every trace of free nitrate, and set on clean blotting paper to dry.

The other plate must then be proceeded with in a similar manner.

By taking them in twos or threes at once, they appear to be more quickly and perfectly dried before exciting.

If immersed before they are dry, the film is sure to crack.

Six plates can be prepared in about an hour.

When dry, they can be stowed away in a plate box, with the coated side of every plate in the same direction, as it is difficult to be distinguished.

They do not deteriorate, when kept two or three weeks, if properly washed; beyond that time I have not tried them, but have every reason to believe they would keep a month *at least*.

The exposure is about the same as for a Fothergill plate, perhaps a trifle longer. I have taken excellent negatives of foliage, on a rather obscure day, in 10 minutes, with a Lerebour's lens of 12-inch focus, and ½-inch stop.

Development.—Either gallic or pyrogallic acids may be used. The former alone is very slow; the latter quicker, but sometimes liable to produce a dirty deposit on the plate. This, however, can be removed with a soft camel hair brush. But the best developer I have tried is gallic acid and acetate of lead. It acts more rapidly than either of the others, and shows less tendency to dirty the film; moreover, it brings up the detail and half-tone with great delicacy, without giving excessive intensity. I use it as follows:—The exposed plate is immersed in a dish of water to moisten the surface, then drained, and about half an ounce of *fresh* saturated gallic acid solution, filtered, is poured several times over the surface to drive off the adherent water. Now add three or four drops of a 40-grain solution of fresh aceto-nitrate (not taken from the bath), and return it to the plate. Keep it moving three or four minutes, then pour it back into the measure and add about 20 minims of a 40-grain solution of acetate of lead. This will make the gallic acid milky. After stirring with a glass rod, dash it quickly over the plate several times, and keep it in motion. The image quickly starts up, and may of course be intensified to any extent by the addition of aceto-nitrate. The best negatives, however, are obtained with the least possible silver.

The plate is then washed and fixed with hypo. as usual.

When dry, the film is very hard, and requires no varnish to protect it.

The foregoing details may appear troublesome, but in practice they are simple enough. I find the plates quite as easily prepared as those by the Fothergill process.

As to its certainty, I will only say that the quality of every negative can be told as soon as the plate is withdrawn from the nitrate bath, all imperfections in the film being then apparent. Consequently, no defective plate need be taken to the field.

I inclose a few prints from negatives by this process, all by the same lens, of 12-inch focus; particulars of exposure, &c., are on the back of each.

They are by no means up to the average; the principal defects, however, are caused by faulty printing; the negatives being capable of giving much better impressions.

Proceedings of Societies.

Blackheath Photographic Society.

The following is the Annual Report of the Blackheath Photographic Society, presented at the meeting on the 21st of May:—

The Council of the Blackheath Photographic Society, in presenting to its members their Third Annual Report, cannot but congratulate them upon its present position and future prospects.

Established three years ago by about seven members, the Society has now increased to forty-two; and the treasurer's account annexed shows a balance of not less than £43 15s. 7d. in favour of the Society.

Its prosperous financial condition is to be attributed, in no small degree, to the courtesy of the Golf Club, at whose rooms the Society's meetings have been held during the past year. The Council beg to tender their best thanks to the officers of the Club for their continued kindness.

During the session 1859-60, the Society's meetings have been numerously attended, and the following list of papers read before it testifies to the zeal and energy of its members. The Council take the opportunity of here acknowledging the kindness of the Press in all that relates to the publication of their transactions, referring especially to the "Photographic News," the *Photographic Journal*, the *Journal of Photography*, and the *South London Journal*.

PAPERS READ BEFORE THE SOCIETY UP TO THE PRESENT PERIOD OF THE SESSION.

"On the application of Photography to Investigations in Terrestrial Magnetism and Meteorology, as practised at the Royal Observatory, Greenwich." (Concluded.) By the President, James Glaisher.

"A Paper on Van Monckhoven's Cellulose Process, as investigated and practised by T. R. Wheeler."

"A Paper on Positive Printing." By A. J. Melhuish.

"On the employment of the Salts of Magnesium as Iodisers." By Charles Heisch.

"The Pistolgraph and its Use." By T. Skaife.

"The Method employed at the Royal Observatory for Registering, by Photography, the Diurnal Variations in the wet and dry bulb Thermometer." By the President.

"On the Reproduction of Engravings, Prints, Ordinary Writing or Letterpress on Prepared Papers by Contact in the Dark." By Chas. J. Busk.

A review of the subjects touched upon testifies that the appeal made to members by the Council, in their last report, has been well responded to; but they would earnestly reiterate that appeal for original matter, to be brought forward at the Society's monthly meetings, feeling persuaded that their success will be promoted from this, rather than from any other source.

The Council cannot point to any very striking contributions to the practice of photography during the past year. The nature and composition of the photographic image—a question of high interest to the photographer—is still occupying the attention of chemists. The experiments recently made by Mr. J. Spiller, of the Royal Arsenal, Woolwich, published in the *Philosophical Magazine* for March, 1860, tend rather to confirm the conclusion of MM. Davanne and Girard, that the image consists of a mixture of metallic silver with unchanged chloride, and are so far opposed to the views of Messrs. Maskalyne, Hardwich, Hadow, and Llewellyn.

The alkaline gold-toning processes are still receiving considerable attention, each modification having its particular advocate. The method, generally, bids fair to be a great improvement upon the old process.

The prints exhibited by M. Joubert, said to be from ordinary negatives, with printer's ink, are superior to any ink pictures yet produced; but, as his process is still a secret, the Council can offer no opinion as to its practical application.

Cognate to the subject of photography are the experiments of MM. Bunsen and Roscoe, lately detailed before the Royal Society, which will be read with great interest by every photographer.

An attempt has likewise been made to employ cotton dissolved in oxide of cuprammonium instead of collodion, recommended by Van Monckhoven as immeasurably cheaper, and, in some respects, more uniform in its composition than collodion. The process would appear to merit further trial.

Since the publication of the last report, the Council have the pain of recording the decease of two of the Society's members—Mr. Hughes, of the Royal Hospital, Greenwich; and Mr. Howe, of Dartmouth Row, the latter a practical photographer. It may not be superfluous here to note the loss the scientific community has sustained in the death of Mr. Andrew Ross, the optician, of Featherstone Buildings.

The Council have considered it expedient, during the course of the present session, to present to members of the Society a print from a negative kindly lent by Mr. Glaisher for publication; and it is their intention, as far as the funds of the Society will permit, to follow that issue by one or more during the ensuing year, as may be determined by a committee appointed by the Council for that purpose.

In conclusion, the Council congratulate the members upon the high perfection to which photography has arrived in its numerous practical applications, not less than upon the prosperity of the Society itself, pressing upon them the necessity of research and original experiment, as the true means by which advancement is to be hoped for; and feeling satisfied that what is added to the general store of facts not only promotes the character of the source from which it emanates, but becomes the property of mankind for ever.

North London Photographic Society.

The concluding meeting of this Society for the season was held on Wednesday evening, May 30, in the Myddelton Hall, Islington. G. **Shadbolt**, Esq., Vice-President, occupied the chair. The attendance of members was numerous.

The **Secretary** (Mr. John Barnett) read the minutes of the last meeting, which were confirmed.

Mr. **Hill** said, at the last meeting Mr. Goslet had exhibited some plates of blue glass, which he said he considered facilitated the printing. He (Mr. Hill) had made an experiment with a piece of blue glass, half an inch thick, but instead of being quicker in the printing, he found that it was considerably slower. He handed in a piece of paper showing the results.

The **Chairman** remarked that he was not quite clear that Mr. Goslet meant to say that blue glass was quicker than any other, but that green glass was slower.

Mr. **Barber**: Did Mr. Goslet say that blue was quicker than white glass?

Mr. **Hill**: Yes.

Mr. **Dawson**: Not quicker than lighter glass, but more rapid in its results than green.

The **Chairman** observed that the Committee of the Liverpool Society had tested the same matter, and they had found colourless glass much better for both the operating room and the printing frame. Some of the glass which had lost its colour in time became slower.

Mr. **Hill** said the first piece of glass was useless in the printing frame. It seemed not to have lost its colour in the slightest.

Mr. **Barber** observed that what was called colourless glass must be of no colour at all.

The **Chairman** observed that if they used a solution of dissolved quinine it would shut out every particle of the actinic rays.

Mr. **Barber** said, that with a solution of quinine you could see the reflection of the colour on the surface of the glass.

The **Chairman**: That is where it stops the actinic rays, according to the theory of Stokes.

Mr. **Barber** then read an interesting paper from Mr. Oakshott, of Ryde, detailing several experiments which he had made upon the fixing of prints.

Mr. **Dawson** now begged to call the attention of the meeting to a few concluding experiments and observations which he had made with the chloride of silver and the hypo. of soda. The experiments had been conducted with fewer matters, and had produced more marked results, and still more confirmed the evidence which he had previously brought forward. He apologised for having occupied so much of their valuable time in discussing a question, and trying to prove a truth, which he presumed few practical photographers ever doubted, namely, the great solubility of chloride of silver in hyposulphite of soda. He, or some other member of the Society, in justice to themselves, and in answer to a direct challenge from a photographer of great practical experience, was compelled to take this course. A contrary statement had been published under the sanction of great names—by men said to be of high standing in science; but who, in these researches at least, had added little new to our stock of knowledge, and that little seemed to be anything but correct. Every valuable suggestion in their researches had been mentioned before by Mr. Hardwich, in one or other of his various papers. The extraordinary fallacy with which they had started, namely, that a ten per cent. solution of hypo. saturated with chloride of silver represented Herschell's first salt ($AgO,S_2O_2+2\ NaO_2S_2$), was both chemically and practically wrong. This their own analysis showed. The facts, and he had more than confirmed his previous experiments, were these:—That one equivalent of hyposulphite of soda of any strength would dissolve chloride of silver, until not an unit of the silver was left in the original solution, and thus convert it into pure hyposulphite of silver, in the shape of an unstable, opaque, white, heavy powder. Nothing would then be left in the liquor except chloride of sodium. Before testing the solution for hyposulphite of silver, it was necessary to submit it for an hour or two to a strong light, because it must be borne in mind that chloride of silver was slightly soluble in chloride of soda. These results had been arrived at by the most conclusive tests, the reaction in chemical language being $AgCl+NaO,S_2,O_2=AgO,S_2O_2+NaCl$. In illustration of this part of the subject, Mr. Dawson produced several results of the experiments he had entered into, all of which he explained in a very lucid manner. He then adverted to some "measly" prints exhibited at the last meeting, when the cause was partly discussed. By a series of experiments, he had come to the conclusion that this deposit, formed in the texture of the paper, consisted either of decomposing hyposulphite of silver or sulphite of silver, or, as he supposed was the case in the present instance, an organic compound of silver, arising from some deleterious matter in the sizing or bleaching of the paper. He showed that the same result may be artificially induced in several ways, and that, under certain circumstances, it was an inevitable consequence of using thick, non-absorbent paper, stale albumen, very weak hypo., and insufficient immersion. The presence of acidity, of partial decomposition of the hypo. bath, also of free nitrate on the paper, must, he said, greatly contribute to facilitate this formation. Mr. Dawson said he had tried Mr. Hardwich's experiment. He threw one hundred grains of chloride of silver into a narrow-bottomed dish, containing four ounces of hypo. of soda in strong solution, and at the end of three days the whole had not dissolved—in fact, it had not been destroyed in any way whatever, but a curious crystalline compound had been formed, resembling meconin crystals; which was evidence of the power of chloride of silver cemented together with hyposulphite. This was perfectly soluble in hyposulphite, or in water.

Mr. **Barber** exhibited a compound, consisting of silver leaf in cyanide of potassium, added to hyposulphite. The latter was still dissolving in the cyanide, but, before doing so, it had turned to a brown colour.

The **Chairman** said, in the process of the conversion of cyanide of silver and hyposulphite into cyanide of potassium, the change in the solution and decomposition went on concurrently. Then, if acid were added, they threw down the silver, and joined in a metallic form, or united with the acid. The acid would unite with and decompose hydrobromic acid.

Mr. BARBER said it was the most difficult kind of chemistry to go into. It frightened every one who attempted it.

The CHAIRMAN said, there were several points of considerable interest brought forward in the two papers which had been read. First of all, in Mr. Oakshott's paper, it was stated that the conditions of the apparent discoloration of pure silver were only formed after a very long exposure, and Mr. Dawson, who had treated of the "measly" effects produced, had most satisfactorily shown the actual condition the substances formed.

Mr. BARBER said, the print he had shown, which had been sent up by Mr. Oakshott, and in which there were spots, had been fixed with cyanide of potassium, and not with hypo. at all.

The CHAIRMAN said the spots were caused by the size dissolving into the albumen, and was only fixed in a partial solution of the size in the paper. On putting the print into water, in a moment these spots would become perfectly apparent.

Mr. DAWSON remarked that the appearances in these prints were not what were called "measles," which would be clearly demonstrated on putting the print into boiling water. In reply to the Chairman, he said these spots were always produced in a very weak solution. One specimen of the paper he had exhibited was about six years old.

The CHAIRMAN said this was another curious thing. He should like to know if the difference between albumenised paper coagulated, and that which had not been coagulated by the metallic solution had ever been tried.

Mr. DAWSON said the specimen shown had been coagulated; for some years ago he did coagulate.

The CHAIRMAN said Mr. Dawson had spoken of having thrown down chloride of silver, which certain gentlemen had stated did not exist. Was any test applied?

Mr. DAWSON observed that it could only be that, or sulphate of silver, or hyposulphite of silver, but it was neither of the latter.

The CHAIRMAN remarked that stale albumen was used by some manufacturers. One day, on entering the room of a person who prepared albumen in large quantities, he observed an unpleasant smell, and was told that they could not work the albumen unless they used stale eggs for the purpose.

Mr. DAWSON: It is quite a mistake.

The CHAIRMAN: Oh, I am aware of that.

Mr. HILL said he never had a "measly" print, which was probably owing to the use of a strong solution of hypo. He used Saxe paper, and sometimes there was a small spot like grease, in the centre, which blackened in the light on drying.

Mr. BARBER observed, that when Mr. Oakshott was in town he showed him some prints, and upon the albumenised paper there was a kind of bluish "blur," which he attributed to putting the albumen through steel rollers. He (Mr. Barber), however, had never any "measly" pictures himself.

The CHAIRMAN could add evidence of having produced "measly" pictures, but this was done purposely, and he had come to the conclusion, that what Mr. Dawson had stated was perfectly evident. If, when toning in an acid toning bath, the print was removed suddenly to hypo. of soda, it frequently produced these "measly" appearances. By passing through steel rollers, the pressure of which was very great, the fabric of the paper was much compressed.

Mr. SIMPSON remarked that, in place of passing the albumenised paper through steel, if it was passed through copper rollers, the particles adhering to it would cause bad results to be produced.

Mr. BARBER thought it better to use a large quantity of hypo. to every bath.

Mr. DAWSON: Not in the least. He always kept it slightly inside of alkaline.

Mr. SIMPSON said he had met with "measly" prints, arising from the blistering of the paper. This was always in the case of the Rive paper.

Mr. DAWSON: I never found any "measled" from that cause. It was not necessary to put the print into hypo.; but, if it was, it might be moved about.

The CHAIRMAN said this had a tendency to prove the inadvisability of putting a large number of prints into one bath.

Mr. DAWSON observed that in the specimen he exhibited last time, he was almost sure the sizing had to do with its appearance.

The CHAIRMAN: It is always in the texture of the paper, you will find.

The CHAIRMAN then said they had for their inspection a new portable tent, exhibited by Mr. Moginy, which had been spoken of in favourable terms. Mr. Legg also presented a specimen of a dry plate which had been kept for eight months without exposure. There was also another that had been kept for ten months prior to exposure. This did not, however, prove that it was advisable to keep plates for any length of time, for there was always a tendency to produce organic change. He (the Chairman) had also got two plates, by the Fothergill process, which he prepared on the 19th of June last, and both plates were exposed early in the morning on the 3rd of May, the weather being very dull. Another, which was prepared by a modification of the Fothergill process, on the 19th of June, he exposed on the 8th of May. Two of these were from five plates, one of which he used simply as a contact plate. He attempted to develop another with iron, but it stained; and for the third plate he used pyrogallic, but it was full of spots from one end to the other.

Mr. HILL said the plates appeared as good as new.

The CHAIRMAN said it was, at all events, evidence to prove that it was possible, if the right means were taken, to keep the plates without being deteriorated; at any rate, for a considerable length of time.

The members then proceeded to examine Mr. Moginy's tent, which seemed in every respect well adapted for its purpose.

Some routine business was transacted, and the meeting separated.

Miscellaneous.

A NEW SECONDARY PILE OF GREAT POWER.—M. Jacobi has recently pointed out the advantages of substituting lead for platina in the application of secondary currents to the electric telegraph. M. Gaston Planté, who has made a special study of these currents, discovered that the inverse electromotive power furnished by electrodes of lead in acidulated water, is about two and a half times greater than that furnished by electrodes of platinised platina, and six and a half times greater than that given by electrodes of ordinary platina. This electromotive power, although produced by plates of the same metal, is also very superior to those of the elements of Grove or Bunsen, in consequence of the great affinity of the peroxide of lead for hydrogen—which has already been so ingeniously applied by De la Rive—in the voltaic cups. The value of this electromotive power is nearly 1·5, that of Bunsen's element being represented by 1. M. Planté has constructed a pile composed of nine elements, presenting a total surface of eleven square yards. Each element is composed of two large and long plates of lead rolled in spiral, separated by coarse canvas, and immersed in water acidulated with one-tenth sulphuric acid. The principal current which must be employed to put this battery in action depends on the manner in which the nine secondary couples are associated. If they are arranged so as to form three elements of triple surface, five small pairs of Bunsen's battery—of which the zinc ring is at least 2¾ inches of its height immersed—suffice, after a few minutes' action, to give a spark of extraordinary intensity upon closing the circuit of the battery. This apparatus acts as a condenser, for it permits of collecting in an instant the work performed by the pile during a given space of time. We may obtain an idea of the intensity of the discharge when it is stated that it would require 300 of the usual Bunsen's pairs, of five inches in height, so as to form four or five elements of four square yards of surface, or three elements of a still larger surface. If the battery be put in tension, we must compose the principal pile of a number of pairs sufficient to overcome the inverse electromotive power developed; nine secondary elements require about fifteen Bunsen's pairs, the surface of which may be very small. This secondary pile is very easily constructed, on account of the malleability of the metal of which it is composed; and, by taking very thin sheets of lead, it may be made to occupy a large surface in a very small space. The nine elements we have constructed are contained in a box fourteen inches square, filled with liquid, once for all, contained in closed jars; they can be kept in a cupboard, always charged and ready for use, by which, with the aid of a feeble pile, we can obtain powerful charges of dynamic electricity.

Photographic Notes and Queries.

LINSEED PROCESS.

Sir,—I find the "linseed process" remarkably good in point of sensitiveness, facility, and brilliancy; it is as its inventor says, no "visionary nonsense," and perfectly "*bonâ fide*." I am, however, troubled with a number of circular *transparent spots* on the plates, varying from one-eighth of an inch to much smaller. Could I succeed in avoiding these, I should certainly discard all other dry processes for this.

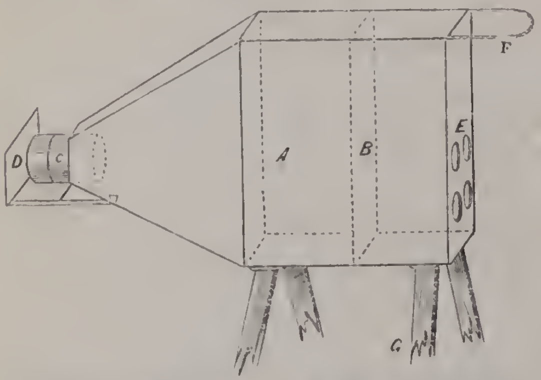
As I dry my plates in an oven, is it possible that the heat may raise the linseed mucilage in bubbles from the film beneath, and thus produce the defects I complain of? If any of the gentlemen who have succeeded in this process would kindly afford me some help, I should be grateful.

I hear a good deal of the *gum process* for facility and certainty. I understand it is not that modification of the *Fothergill* process, recommended in your journal some time ago by Mr. Keene, in which gum was substituted for albumen, but something rather *better* and *simpler*. There are photographers in or near Manchester, who, it is said, "can tell all about it."—Yours very gratefully,

Round Spot.

NOVEL APPLICATION OF THE CAMERA.

Sir,—I am but a humble follower of the "delightful art," and the other day, while trying to take an enlarged view from a stereo. group (*i.e.*, endeavouring to get an enlarged likeness from one face in the group), I pulled out the focussing-glass very far, covering the opening between the two parts of the camera with black cloth. This suggested to me an improved "peep-show," a rough sketch of which I inclose:—



A. Body of the puppet-show.
B. Ground glass screen.
C. Movable lenses.
D. Photo. view (stereo. size).
E. Cosmoramic glasses.
F. Brass rod for curtain.
G. Legs to the instrument.

My means will not allow me to make experiments; but, should you think it would answer, I make the photographic world a present of the idea.

Spx.

NEGATIVE-DEVELOPING AGENTS.

Sir,—I should be very glad to learn your opinion of the relative merits of the various developing solutions for collodion negatives. Certain operators make a great mystery as to their "developers," as if they possessed some valuable secret unknown to adepts in chemistry; but my belief is, that they know nothing but what they have seen in print. I have tried all the formulæ which have come under my notice, and I like that least which is among the most popular and commonly used, viz., sulphate of iron. An investigation into the relative merits of the various developing agents would not be an idle task for a committee of the Photographic Society. There can be no doubt that different developers must have a very different effect upon the negative image, and, consequently, on the positive proof also. Protonitrate of iron was once in vogue; why has it gone out of favour?

If you deem this subject worthy of consideration, perhaps you will devote a portion of your space to it. I am sure it would be acceptable to the body of photographers.

F. S. T.

May 31, 1860.

MEETINGS OF PHOTOGRAPHIC SOCIETIES.

Tuesday, June 5—London Photographic Society.
Thursday, ,, 7—Belfast Photographic Society.
Wednesday, ,, 13—Chorlton Photographic Society.
Monday, ,, 18—Blackheath Photographic Society.
Thursday, ,, 21—South London Photographic Anniversary.

TO CORRESPONDENTS.

W. L. C.—1. Reticulations may be avoided by moving the plate up and down in the bath frequently. 2. It will depend upon the quality of the collodion. 3. "Too much" bromide will act mechanically, causing the film to tear. 4. The same as iodide of potassium; it becomes red by keeping. 5. We prefer the cadmium salts. 6. The "sharpness" will depend on your using a small stop. Read the articles on Photography and its Applications, in recent numbers of the "Photographic News."

Alpha.—1. The serum of milk will keep if contained in a closed bottle, first putting on the surface of the fluid a few drops of ether. It should be kept in a cold place. 2. We do not think there is any particular choice. 3. If the film slips off it is probably due to the mode of cleaning the glass plate; it may, however, be due to the particular kind of collodion you use.

F. Brixton.—Your difficulty seems inexplicable. It does not appear to be with the bath. Upon encountering a similar annoyance, we added as much loaf-sugar as nitrate of silver to the bath, and then the lines disappeared; but we cannot venture to define the reason. We conclude your bath is saturated with iodide of silver.

Stereoscope.—It is impossible to say in what your deficiency lies. If you focus upon near objects, stereoscopic effect *must* be apparent; not so much so, if you take distant objects. You had better seek a hint from some practical friend. It may happen that you have not mounted your pictures aright.

Samuel.—You appear to have confounded glycerine with glycyrrhizine, two very dissimilar substances. Glycerine is employed as a preservative agent. Glycyrrhizine was, for a short time, in vogue as an accelerating agent. They both appear to be consigned to the tomb of the Capulets.

Positive.—1. We do not understand the question No. 1. 2. Liquid glue, or lac, dissolved in spirits of wine, of the consistence of cream. 3. There is but one kind of genuine bitumen, which readily dissolves in turpentine when warmed.

Portraiture.—The choice of east or west will depend upon whether you work more in the morning or in the afternoon. We prefer the west; but it matters little, if the light be properly reflected on the sitter. We do not know the address.

Wanting.—1. Your accident is unusual. It is probably due to your not washing the film sufficiently before fixing. 2. Particulars will be given shortly.

J. Conway.—The cloudiness and precipitate formed upon diluting your nitrate bath is due to the presence of iodide of silver; allow it to subside, then filter.

Higham.—A formula containing half a dozen iodides, three bromides, two chlorides, and a fluoride, must be a hoax. We should not be inclined to try it.

F. C. A.—It is not necessary that you should make your own collodion; unless you have had experience in chemical manipulation, it is hardly probable that you will succeed, without many failures.

R. P.—It is a good plan to add solution of ammonia to the albumen at all seasons, but especially in hot weather; it checks the tendency to putrefaction, and renders the albumen more fluid.

Peter Pindar.—You have made of your bath a most heterogeneous compound of all the ills that photography is heir to. Recover the silver by one of the processes indicated in this journal.

Collodion.—Too much iodide, or too much alcohol, will cause the film to slip off when washed. The remedy is more pyroxyline and ether. The result ensues if the glass plate be humid when the collodion is poured on.

J. Hope.—You have probably used the bath too soon after it was mixed. It should stand four-and-twenty hours.

S. T.—Ambrotype is the name given by American photographers to collodion positives on glass.

Lotos.—You will find the details of M. Gaumé's method of preparing positive paper in No. 2 of the "Photographic News."

C. C.—It is not advisable to use your toning bath until it has been prepared four-and-twenty hours.

O. P.—Mica will doubtless answer your purpose better than glass for the micro-photographs.

C. Crofton.—Iodide and bromide of silver are rarely found native. Specimens have been met with in Mexico.

W. O.—We cannot believe the statement without seeing the results. The Hillotype was a cunning hoax.

Lucy.—You would be very imprudent to answer the advertisement; if you do, you must expect to meet with insult.

Junior.—It would take a complete treatise on photography to answer all your queries. Consult a practical photographer, and pay him a fee.

W. T.—Your positive print shows that your negative is greatly over-developed.

O.—We always develop with protonitrate of iron, having found that it yields the finest details.

X. Y. Z.—The fault is not with the bath, but in the collodion; try another sample.

Ixion.—The formula for the aplanatic lens given by Sir John Herschel is the basis; it requires adaptation to photographic purposes.

Undine.—We gave the formula for Mr. Maxwell-Lyte's toning-bath in our last number.

Cockled.—Damp the mount with a clean sponge and water before pasting on the proofs.

J. W.—Consult the index of the volume just completed.

Paxton.—You will find an answer in our advertising columns.

Communications Received.—W. Crum.—E.C.—Lawnd.—A. W. Hall.—W. T.

⁂ All editorial communications should be addressed to Messrs. **Cassell, Petter, and Galpin**, La Belle Sauvage Yard, London, E.C.

THE PHOTOGRAPHIC NEWS.

Vol. IV., No. 92.—*June* 8, 1860.

COLOUR IN ITS RELATION TO PHOTOGRAPHY.*

BY CHARLES MARTEL.

Colour is an abstract quality, an optical condition of bodies. Every body in nature and in art has its own particular colour peculiar to itself, which may change with the varying conditions of that body—conditions produced by changes in the molecular arrangement of the particles of which the body is composed, and by chemical action. Thus the leaves and herbage, which in spring are of various hues of green, in autumn become yellow, red, orange, and russet; the changes being probably due to an alteration in the chemical condition of the vegetable body. Heat effects changes in the colours of certain bodies. Volume or quantity also influences the colour of bodies: thus, the ocean varies in hue, from ultramarine, through emerald-green, blue-green, down to sea-green, according to its depth, and other circumstances.

Variety of colours in natural objects is equally great in the animal, vegetable, and mineral kingdoms. The plumage of various birds, and the bodies of certain insects and fishes, are rivalled in splendour by the colours of tropical flowers, or of those of countless minerals. Even the atmosphere displays the most gorgeous hues in the sunset of tropical countries, and also in our own, at intervals.

The word *colour* must not be confounded with *pigment.* Colour signifies an abstract quality or condition of material substances, but not the material itself: to the latter, the term pigment, or paint, is more appropriate. Unless this distinction be observed, it is impossible to express ourselves intelligibly, when speaking of colour. If we call a pigment a colour, we may be compelled to say, "this colour is a bright colour," instead of, "this pigment is of a bright colour."

To avoid confusion, it is necessary to establish certain types of colour, accessible to every one, in order that, when we speak in the abstract of blue, red, yellow, &c., we may be sure we know what is meant. By speaking of pigments as colours, when a blue is named, we are at a loss to know whether ultramarine, cobalt, or prussian, blue be meant; but if we refer *blue* to the type, there can be no confusion.

Now, the type of pure colours is found in the prismatic spectrum, and in a weaker or attenuated degree in the rainbow. It is usually stated that the spectrum consists of seven different colours, but, upon examination, it will be found that it consists either of six only, or of an indefinite number; either of six positive pure colours, or of an indefinite number of *hues* of these six colours.

There are, in fact, but three simple colours, viz., blue, red, and yellow: these are termed *primaries* (pure colours), and, when mixed in pairs, they produce *secondaries*, also pure colours. Thus, blue mixed with red yields violet, which, theoretically, consists of blue and red in equal quantities and in equal strength; but as the blue or the red may preponderate, we have various *hues* of violet, to which we give the names of indigo, hyacinth, lavender, &c., all of which are pure mixtures of blue and red. So also, blue mixed with yellow, in varying proportions, yields various hues of pure *green*, to which the terms emerald-green, grass-green, &c., are given, according as the blue or the yellow predominates. The mixture of red with yellow produces *orange*, which is much more limited in the number of its hues than the mixtures of the other primaries, in consequence of the similarity of the two colours.

It will be observed, that so long as we mix only two primary colours, we obtain a *pure* secondary colour; but as soon as the third primary is introduced into the mixture, *grey* is produced. The term *tertiary* is objectionable, as from the varying quality of the pigments employed for mixtures, it is scarcely possible to say beforehand what the exact hue of the mixture of three primary-coloured pigments will be, supposing they were attainable. We do not possess any pigments which may be said to truly represent the purity of the colours of the spectrum. Ultramarine is the nearest, but even when pure it has a slight violet tinge. Therefore all formula based on the theoretical qualities of colours are useless when we come to put them in practice. There is no type of *russet*, or of *olive*, or of *citrine;* if a score of painters were called upon to produce samples of those colours, it is probable that no two would be exactly alike.

It is much better to style mixtures of the three primary colours *greys*, qualified by the addition of the primary or the secondary from whence they are derived. Thus we obtain blue-grey, red-grey, green-grey, &c., and the list may be greatly extended by the addition of another appellative, as yellow-green-grey, blue-green-grey, &c.

Normal grey is the mixture of black and white pigments as pure as we can obtain them; it will vary in tone or intensity, according as we mix the black with the white in greater or lesser proportion. To obtain a coloured grey, we can mix the primary or secondary-coloured pigment, in varying proportions, with normal grey, instead of mixing the three primary colours. It will be remarked that the same result will follow if we mix with a primary the secondary colour which does not contain this primary, as blue with orange (yellow and red), red with green (blue and yellow), yellow with violet (red and blue).

When we wish to indicate the intensity of a colour, we employ the word *tone.* Taking the pigment at its normal intensity—as prussian blue, for instance—we reduce or weaken its tone by diluting it (if it be water-colour) with a greater or lesser quantity of water; or (if oil-colour) by the addition of white paint; while we deepen its tone, more or less, by the addition of black. A weak tone is usually called a *tint*, and a deep tone a *shade;* but the term *tones* is preferable.

By the word *hue*, we express the colour produced by the mixture of two pure primary colours in varying proportions. Thus, blue may be mixed with yellow in such quantities that the yellow will always remain yellow, and tinge the blue, so as to produce green, and *vice versâ;* and so with mixtures of the other primary colours.

Light is the source of colour. It is thought by some philosophers that bodies possess no colour intrinsically, but that they have the power of decomposing white light, absorbing a certain portion of coloured rays, and reflecting others; the portion absorbed making up, with the quantity reflected, the total number of rays necessary to reproduce white light. On this theory, therefore, a red substance absorbs the green rays of the spectrum, and reflects the red; inasmuch as prismatic green and red constitute the complement of the rays that make up white light, and red and green are said to be *complementary* colours. The mixture of complementary colours always produces, theoretically, white, and, practically, black, if they are of equal intensity, and in suitable proportions.

Thus much on the nomenclature of colour is necessary, in order that what follows may be clearly understood.

The various colours of the spectrum, and of material bodies, exercise a very different action on the sensitive salts of silver employed in photographic operations. Thus, while those colours more or less allied to blue act chemically upon iodide and chloride of silver, yellow, orange, and red scarcely affect them at all; and, moreover, there are invisible rays in the spectrum which also affect iodide of silver. The green rays—which have little or no effect upon iodide of silver—act upon bromide of silver; hence the advantage of adding a bromide to photographic collodion. Red, yellow, and orange will also, after a long exposure, act upon the bromide of silver, but not to the same extent as the blue, violet, and indigo rays. This effect is expressed in the following terms:—That the most refrangible rays of the spectrum have a very energetic action on the layers of iodide and bromide of silver, while the least refrangible rays have a very slow action; but, by means of a prolonged exposure, the inactive colours may be made to completely decompose the sensitive layer.

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* Continued from vol. iv. p. 50.

In taking a picture in which varied colours occur, the blues and allied colours produce the photographic effect long before the yellow, orange, &c., have made any impression. Yet, upon developing, it will be found that even these latter will exhibit some signs of action; this is because most substances are coloured, not with pure prismatic colours, but with impure colours, which reflect other rays besides those we call yellow, orange, &c., and moreover, from their lustre, gloss, polish, &c., they reflect a considerable quantity of white light, which acts upon the sensitive iodised or brominised surface.

This peculiarity of the chemical action of colours on the sensitive surface becomes a source of error in depicting certain objects. Thus the Pyramids of Egypt, which are of a warm yellow colour, appear in photographic views as if they were dark and sombre like those of Europe erected during the middle ages.

But the resources of photography supply the means of overcoming this difficulty.

(*To be continued.*)

APPLICATION OF PHOTOGRAPHY TO PHYSICAL GEOGRAPHY AND GEOLOGY.*

BY M. A. CIVIALE. A DRY PAPER PROCESS.

I do not claim the invention of this process; I have only made a selection from various methods, to form a combination as suitable as possible to the aim I proposed to myself in obtaining a landscape view—the rendering of the different planes, fine details without hardness, and moderate time of exposure. Negatives on dry waxed paper have always appeared to me to best fulfil the first two conditions. I therefore endeavoured to impart great rapidity to waxed paper, at the same time retaining its other special qualities.

I shall now describe the method I adopt, the composition of my baths, and the various points worthy of remark in my operations.

Paper.—I have used negative *Saxe* paper, carefully selected, and free from spots and holes. The waxing is performed in the usual manner; but as the wax is frequently unequally distributed in the texture of the paper, I immerse the sheets in a bath of iodised cereoline, which is prepared as follows:—

Dissolve 10 parts of pure white wax in 1,000 parts of alcohol, placing the bottle in a water-bath, to facilitate the solution. Allow it to stand four-and-twenty hours, then filter. The liquid portion is the cereoline employed for the iodising-bath.

BATH NO. 1.—BATH OF IODISED CEREOLINE.

950	parts of cereoline		
32	,,	iodide of potassium ...	dissolved in 100 parts of alcohol.
3	,,	bromide of ditto ...	

This quantity of iodide and bromide of potassium is necessary for the cereoline bath to remain always in a state of saturation.

When about to be used, this bath is filtered into a porcelain dish, which must contain sufficient liquid to admit of the sheets being completely immersed when iodising. The bath may be used until exhausted. The sheets are plunged in one after another, avoiding bubbles; if the latter do form, however, they are easily removed by raising the dish, a slight agitation of which will cause the sheets to become completely immersed.

I must here notice a precaution necessary to be observed in using baths. Before putting the negative or positive paper in contact with the liquid, a strip of glazed paper should be carried edgewise over the entire surface, so as to remove whatever scum or impurity may exist there; and this remark applies to baths of iodide, of nitrate of silver, negative or positive, gallic acid, and hyposulphite of soda.

The sheets being immersed one by one in the bath of iodised cereoline, must remain in it until they have acquired a reddish-brown tint, which arrives sooner or later, according to the age of the bath. The time of immersion of the sheets will vary from one to two hours.

Some time before withdrawing the sheets of paper they should be turned in the bath with a pair of horn pincers, so that the first to be immersed shall be the last to be withdrawn; they are then hung on a cord to drain and dry, held by wooden clips, which are preferable to pins, especially for sheets of large dimensions. To facilitate the draining of the liquid, a piece of blotting-paper is attached to the lower corner of the sheet. In about an hour the sheets will be dried, and ready to be placed between leaves of blotting-paper in a portfolio. Paper thus prepared will keep a long time. Sheets have been used after being prepared a year or more, and gave very good results.

This is the only part of the operation which can be performed by daylight; all the others must be carried on in a room lighted by a candle, or a lamp glazed with orange-coloured glass.

SENSITISING BATH.

To obtain very fine negatives, it is best to sensitise the paper on the morning of the day it is to be used, or, at longest, the evening before. Paper prepared two days previously often yields proofs somewhat granulated in appearance, the black tones of which are rather red. The composition of the sensitising bath is as follows:—

BATH NO. 2.—SENSITISING BATH.

Distilled water	1,000	parts
Fused nitrate of silver	60	,,
Crystallised nitrate of zinc	24	,,
Glacial acetic acid	30	,,

Dissolve the nitrate of silver in one-half the water, and the nitrate of zinc in the other half; mix the two solutions, then add the acetic acid. Filter immediately before using, and add a few drops of nitrate of silver to the bath after each series of ten sheets is immersed.

Immerse one sheet at a time in the bath, and when the brown tint has entirely disappeared, giving place to a straw yellow, which, by the light of a candle, will appear quite white, remove the sheet to a dish of distilled water, in which the superfluous bath-solution is washed off. This washing liquid must be kept, to be added, in small quantity, to the gallic acid bath in developing.

The sheets will require a second, third, and fourth washing, in separate dishes of distilled water, which will occupy some thirty or forty minutes. The sheets may then be considered entirely free from any portion of the bath likely to injure them. As the iodide of silver formed is quite insoluble in water, it matters little how long the washing is prolonged.

The sensitised paper is dried by each sheet being placed between three sheets of blotting-paper successively. This operation is performed in the following manner:—Take the first sensitised sheet from the dish by the pincers, and place it between the first folded sheet of blotting-paper, and press out the moisture; then take it by the pincers, and pass it in succession to the second and third sheets of blotting-paper, and, lastly, into a portfolio. The first sheet of blotting-paper is hung up to dry; the second sheet is put between the second sheet of blotting-paper, and then in the third of the first operation, and next into a sheet of fresh blotting-paper, and lastly, into a portfolio; and so on for the other sensitised sheets. The negative paper should be kept free from the air, in the portfolio, until required to be placed in the camera.

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* Concluded from vol. iv. p. 53.

Exposure.—No rules can be given for regulating the time of exposure in the camera, since it varies with the season of the year, the hour of the day, the state of the atmosphere, the quality of the lens, and the size of the aperture, or diaphragm. Six or eight minutes will be found sufficient in many circumstances, while seventeen or eighteen will be required in others. The time of exposure may be wonderfully abridged, however—say from eighteen minutes to four, or even two—by immersing the proofs, after exposure in the camera, in the sensitising bath, and after it has remained ten or fifteen seconds, taking it by the horn pincers and putting it into a bath of

Distilled water	1000 parts
Gallic acid	3½ ,,

Proofs thus treated present the advantages and inconveniences of wet paper—viz., greater rapidity, coupled with greater hardness in the image, and greater uncertainty in the results.

Stormy weather sometimes causes the silver in the bath to become reduced; therefore, the greatest cleanliness in using the dishes is required. The paper should have been iodised at least within six months. Hitherto, I have not succeeded in obtaining good results, except with sheets sensitised on the morning of the day I used them.

It is possible that uniformly good results might be obtained by increasing the quantity of acetic acid in the aceto-nitrate bath, or in slightly modifying the latter; but I have not yet had time to make experiments.

On paper prepared in the manner described I have taken portraits in the shade in 40 to 50 seconds; and landscapes, using a small diaphragm, in 1 to 2½ minutes.

Waxed papers, prepared by other methods, give analogous results, when immersed in the sensitising bath.

Developing.—The proof, on being taken from the camera, first immersed in the nitrate bath, is next immersed in the bath of gallic acid. If the exposure has been well timed, the image appears of a red hue, which gradually deepens to black; the whites should remain pure, when viewed by transmitted light; the operation is stopped when the proof, very vigorous in tone, gives all the details expected. If the whites are seen to become tarnished, and the proof to become mottled, the proof must be immediately removed from the bath, and placed in a dish of water and washed. A soft brush will be required to pass over the surface of the proof, to brush over both sides of the paper to remove the deposit from the picture. The proofs will require three several washings at least, after which they may be left in a dish of water as long as convenient.

Fixing.—The proofs are fixed in a bath of hyposulphite of soda, of the strength of 20 per cent. Upon immersion in this proof, the yellow colour of the iodide entirely disappears. If the proof be weak, it should be withdrawn immediately, and washed for six or seven hours in eight or ten waters, then dried between sheets of blotting-paper.

The proof when dry, seen by transmitted light, will present a mottled appearance: to remove this, it is necessary to place the proof between folds of blotting-paper, to avoid their rubbing against each other.

Distilled water is not likely to be met with in most places visited by the travelling photographer, nor is it absolutely necessary. Rain water collected in rural places, melted ice or snow, answers equally well; and even spring water, rising from a sandy soil, will be unobjectionable in many instances. With water obtained from the sources indicated, the gallic acid bath will frequently remain longer colourless than when distilled water is employed.

DESCRIPTION OF THE TRAVELLING CAMERA OF M. A. CIVIALE.

This camera is composed of two distinct parts:—1st. The base. 2nd. The camera-obscura, properly so called.

The base, represented in fig. 1, is composed of a wooden frame, strengthened by the cross pieces A A, B B. At the extremity of the frame are two tongue pieces, C C, in which a longitudinal opening is cut; two similar openings are also made in D D; they have also divisions on their anterior surface, the use of which will be explained hereafter, as well as that of the two screws, E E. By means of the hinges at F F the base folds upon itself, and occupies the space exhibited in Fig. 2.

The camera is of the usual form, with this difference, that it has a very short body. A bellows is fitted to the fore part of the camera, in front of which is a board, which carries the lens in its brass mount. It is adapted to the base in the following manner.

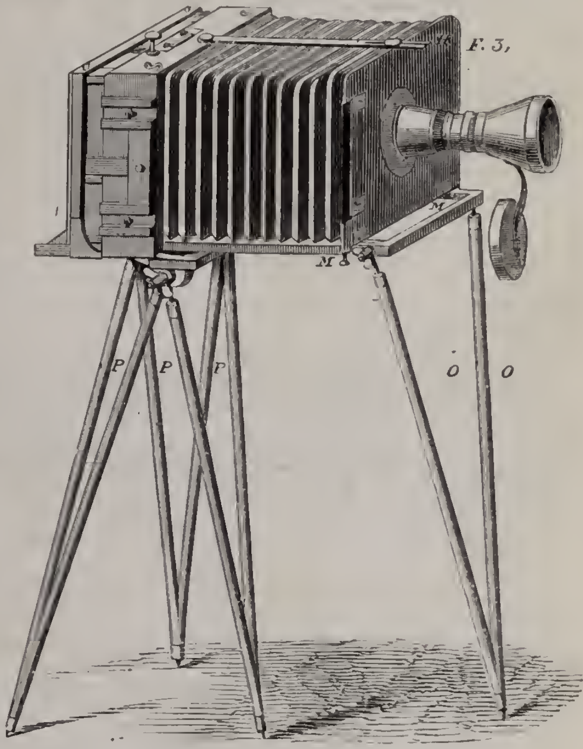


Fig. 3

The camera being placed as desired, either on its bottom or its side, the two tongues C C (fig. 1), are fitted into the grooves G G (fig. 3), and kept in their places by the two screws. The

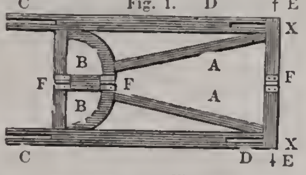


Fig. 1.

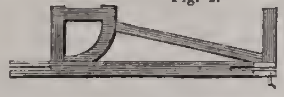
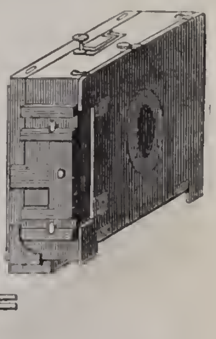


Fig. 2.

Fig. 4.



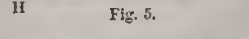


Fig. 5.

bellows is then drawn out, and fixed at the other extremity of the base by means of two screws similar to the others. The screws pass through the openings D D (fig. 1), allowing the board holding the objective to travel backwards and forwards, and so lengthen or shorten the focus.

In order to give all possible stability to the camera, a wooden bar H (figs. 3 and 5) is placed on its upper part. This bar has slits at each extremity, which admit of its being fixed by means of screws.

This bar also bears, on the end in front of the camera, divisions corresponding to those of the base already mentioned, and which allows of the camera being lengthened, and of placing the board carrying the objective perpendicular to the base.

All the screws, except two (M M, fig. 3), are sunk, and worked by means of a key.

The base, which carries the body of the camera, folds upon itself by means of hinges, and is fixed underneath with two wooden screws.

The focussing of the camera is easily done, and regulated by two brass tongues fixed to the front, and sliding on the base. This range, although short (about two inches), has been calculated so as to serve, in all possible cases, from 30 feet to the horizon. The frame which carries the ground glass is fixed, after the focussing is effected, by a button placed in the base, and also by another at the top of the camera, so that it is immovable.

As already stated, the camera can be placed in two directions; it can also be used for all kinds of photography, and receives all kinds of slides.

The tripod will be easily understood from the woodcut. It consists of a wooden disc, underneath which is fixed a plate of the same kind, to which three double legs, P P P, adapt themselves by means of nuts entering sockets, and held together by means of screws. The two screws, E E, of the base (fig. 1) receive, in certain cases, two supplementary branches, O O, which serve to consolidate the apparatus when the wind blows violently.

The camera is very easily dismounted. Remove the bar, and loosen the screws which hold the board carrying the objective, and fold the bellows up; unfasten also the screws that hold the wooden portion of the camera, and fold up the base; unscrew the camera from the top of the tripod, when the whole is ready to be packed up in a leathern bag, arranged so as to be carried like a knapsack.

In one compartment of the bag, the top of the tripod is placed, and the legs are carried in a case, which also holds the folded base.

The camera, all mounted, is easily carried to a considerable distance, yet it is better to carry the objective separately, in case of accident.

It will be observed that the camera in fig. 3 is mounted on its bottom; it is easy to place it on its side, by putting the tongues C C into the slits G G; the opening will be found at Z Z of the portion X X (fig. 1), being that to which the board carrying the object adapts itself.

In the interior of the camera, a box, containing eight frames, is placed, also the ground glass, and the black cloth; fig. 4 represents the camera shut up for carrying.

DESCRIPTION OF THE GONIOMETER.

This instrument serves to determine both horizontal and vertical angles, and accomplishes this twofold object with an approximation which suffices in most cases. Its form and size are such as to admit of being easily carried, since it measures only 8 inches in length, 2½ in breadth, and 1¼ in thickness.

The instrument is composed :—

1. Of a wooden support A, containing a spirit level.
2. Of a telescope L L, mounted on a plate of brass, carrying a vernier, giving the vertical angle to a minute nearly.
3. Of an arc of a circle in brass C C, divided into 90 degrees, and folding in an opposite direction to the telescope.
4. Of two pinules E F, folding under the support A B.

This goniometer, which I make use of to complete the indications which photographic views give of mountains, is placed on the camera, when it is brought into the horizontal position by means of the spirit level. The vertical angles are ascertained by viewing the different summits by means of the telescope, and reading off the degree on the arc of the vernier, by the aid of the vernier.

Let H designate the height of the vertical comprised between the summit viewed, and the horizontal plane passing through the station point.

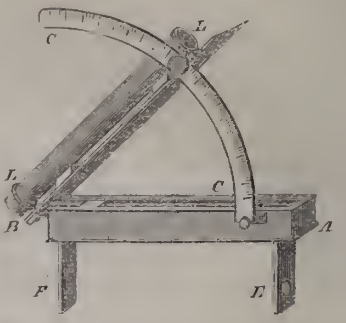
D, the distance of the station point from the vertical H.

a, the vertical angle.

Showing the relation $H = D \sin a$, the measure of a is immediately found.

If D is known by the maps, or any other means, we can calculate the height of H.

If, on the contrary, H is known, we can calculate the distance D.



We see, then, that the heights of summits being already calculated by means of the barometer, we can deduce with sufficient approximation the heights of inaccessible summits near to the first.

It is assumed that the height of the station-point above the level of the sea is known.

To measure the horizontal angles, the instrument is placed on its side, and, by means of the pinules and the telescope, the observation is taken; and, if care be employed to trace a line in using the support as a ruler, this line prolonged permits of the horizontal angles being taken throughout the whole extent of the circumference.

ON THE PHYSICAL CONSTITUTION OF THE SUN.

THE physical constitution of the sun, moon, and planets, has occupied much of the attention of philosophers of late years; so also have the emission of light and heat. It is now known that light and heat obey absolutely the same laws; and as it is well established that light results from ethereal vibrations, one must conclude that heat is also due to vibrations, which may differ in form, and especially in regularity, as was observed by Fresnel in his treatise on light.

The idea entertained by chemists, at the end of the last century, of a caloric agent combined with ponderable matter, must now be abandoned. The word *caloric*, which has never been accepted by geometricians, has no more right to remain in the vocabulary of the sciences than the word *luminic* would have to be introduced into it. A homogeneous point emits its heat and its light equally in all directions: this is an axiom universally admitted.

If, under the double relation of light and heat emitted, the body were heterogenous, we divide it into parts sensibly homogeneous, and restore it, by reasoning, to the case of a radiation uniform for each element, but differing from each other. We speak now only of homogeneous matters; and to fix our ideas, will consider the material points as very small spheres, placed side by side, or at a distance from each other.

The first layer of these points or spheres, which forms the surface of a body, will freely emit its calorific, or luminous rays; the second layer will also emit them through the interstices of the first, but less powerfully than they do; the third layer still less, and so on, to a certain depth beneath the surface of the body. Now, whatever be this gradation, it is clear that it will receive on the exterior only the rays setting out from the points, and portions of the points not eclipsed by other points; that is, that they will receive equally from every direction comprised within the cone, the summit of which is the eye of the observer, and of which the surface is tangental to the body submitted to observation.

In other terms, the body, supposed to be in a state of equal temperature, or equal incandescence, will appear uniformly warm, or luminous, at every point of its surface, whatever may be its form. Besides, this equality of caloric or luminous action under the same visual angle, is independent of distance, for the number of radiating points comprised in this angle will be in direct ratio to the square of the distance, and the effect of their radiation in the inverse ratio of the same square. Thus solar light and heat are identically the same under the same visual angle at aphelion and perihelion; and this equality would also exist if the sun were transported to the distance of the stars.

The demonstration of the radiation of heat given by Fourier is founded on the same principles, and leads to the same results. If this condition be not fulfilled—if, for example, the extreme surface of a metallic body has acquired an increase of density by being polished, or by hammering, or by fusion, or simply by the introduction of matter within its pores—the radiation will obey other laws: there will be what is called *a surface action*, more or less difficult to calculate, but which will in no way contradict the mathematical principles of radiation.—*La Lumière.*

SCIENTIFIC GOSSIP.

In a recent number ("Photographic News," vol. iv. p. 27), we gave an account of some experiments which Mr. Spiller had made, with a view to determine the nature of the decomposition which the sensitive silver salt used by photographers undergoes when exposed to solar light; one of the results arrived at was, that chlorine was evolved. This fact is not stated by Mr. Spiller as a new observation, but he proceeds to draw some very philosophical deductions from it, and has devised experiments which show some interesting facts. It is well known that chlorine, when brought into contact with solution of nitrate of silver, reacts on the latter, precipitating it as chloride with formation of nitric and hypochlorous acids. The following equation will explain the reaction to our chemical readers:—$Cl_2 + AgO.NO_5 = AgCl + ClO + NO_5$. It follows, therefore, that if a solution of nitrate of silver be employed in conjunction with the chloride, as in the ordinary practice of photography, the evolved chlorine will exert its own peculiar action on the silver solution in contact, precipitating from it an additional amount of chloride, which, in turn, will become acted upon by further exposure to light with evolution of chlorine; and so the decomposition will go on, and ultimately, the whole of the silver in a solution will be found to have been removed from it by exposure to light in contact with the requisite amount of chloride of silver, leaving only mixed nitric and hypochlorous acids, as residual products dissolved in the water. This being the case, it follows as a natural sequence, that other metals whose salts are precipitated by chlorine, might be removed from solution in the same way; and this our author has proved in the case of nitrate of lead. Furthermore, it having been found that the white chloride, darkened with a rapidity regulated by the energy with which the liberated chlorine was removed from its sphere of influence, Mr. Spiller was led to try several experiments, the details of some of which recently appeared in our pages, by which it was proved that reducing agents, protochloride of tin especially, as also certain alkaline solutions, greatly facilitated the decomposition.

The subject of the correlation of the physical forces must always be interesting to those engaged in the study of any branch of science. M. Quincke has recently discovered a curious phenomenon, which seems to point to a direct relation between motion and electricity. When pure water flows through a porous body, an electric current is set up. The experiment is made by cementing two platinum plates into a glass tube, separating them by means of a porous diaphragm—any porous body may be used, but flowers of sulphur appear to give the strongest current—and then forcing distilled water through the tube. On connecting the two platinum plates by means of wires to the terminal poles of a delicate galvanometer, an electric current will be found to pass through the tube in the same direction as that of the flow of water. The amount of electricity evolved seems to be independent of the size and thickness of the plate, and also of the amount of water flowing through, but is proportional to the pressure employed. The production of dynamic electricity, by means of friction, has been long known, and the friction of silk against sulphur is one of the best means of obtaining it; but it has not been known, until now, that the friction of water against sulphur would evolve static electricity.

IRON DEVELOPING AGENTS FOR NEGATIVES.*

BY M. A. GAUDIN.

The salts of the protoxide of iron are prepared in two ways: either by double decomposition, or by the direct action of the acids upon the iron *in great excess.*

In the first case:—prepare solutions of sulphate of iron and of the salt of lead, by dissolving, on the one hand, 17 parts (drachms or ounces) of sulphate of iron; and 20 parts of nitrate of lead for the second, and 24 parts of acetate of lead for the third, in the least possible quantity of water, so as to form saturated solutions; and when all the salts are dissolved in their water, throw the solution of 17 parts of sulphate of iron into the solution of 20 parts of nitrate of lead, to form proto-*nitrate* of iron; or into the solution of 24 parts of acetate of lead, to form proto-*acetate* of iron. In both cases a very dense precipitate of sulphate of lead is thrown down; so that in a few hours the proto-nitrate can be separated by decantation, and the precipitate placed on a filter gives a fresh portion of the proto-salt.

Proto-*nitrate* of iron, when recently prepared, is of a very light yellow colour; the proto-*acetate* inclines to a brown.

If the operation has been effected with concentrated solutions, these salts will keep very well in tight-stoppered bottles; the portion required for daily use being taken out and diluted with water.

In order to obtain solutions still more concentrated, I have often prepared the proto-salts in acting upon the metal in a finely-divided state with the acids.

To succeed in this, boil iron wire or filings with concentrated acetic acid, or diluted nitric acid, the iron being in great excess, and the ebullition maintained for a long time. By these means a brown concentrated liquid is obtained in both cases, which keeps well on its iron in excess, and *reduces* perfectly, always taking care to dilute with water the portion intended for the day's use. Contrary to the sulphate of iron, we cannot establish a formula for using it, having nothing to do with crystals nor with solutions always comparable in their power of reduction: but here the latitude is very great; we can employ a solution ten times stronger in one case than in another, without any difference in the result, except greater promptitude in the reduction.

The best course to follow in this case is to prepare at once a large quantity of the most concentrated proto-salt possible; then to gradually determine what proportion of water it is best to add to effect the reduction.

The proto-salt suitably diluted with water is employed like pyrogallic acid; that is, after adding dilute nitrate of silver, pour it over the plate still covered with its nitrate of silver. It is very advantageous to dip the plate into the nitrate bath after taking it out of the camera: by this means the coating is more homogeneous and composed of a less concentrated solution.

The image generally makes its appearance slowly, but it gradually becomes stronger and stronger during a long period of time, and the proto-salts prepared with acids often yield negatives red by transmitted light, and of exquisite fineness.

(*To be continued.*)

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* Continued from vol. iv. p. 50.

POSITIVE PRINTING.—RECOVERY OF OVER-PRINTED POSITIVES.

Over-printed positives are generally thrown away as spoiled beyond redemption; but an eminent photographer, M. Vernier, jun., has suggested that they may be recovered by the following means. Prepare an alkaline bath of cyanide of potassium, as follows:—

Water	1	pint.
Cyanide of potassium	15	grains.
Strong solution of ammonia	1½	drachms.

This solution, although very weak in cyanide, is sufficiently active to reduce the picture in four or five minutes, according to its intensity; but the employment of this solution is still more advantageous for positives taken from over-developed negatives, where there is too great a contrast between the light and dark parts. In this case, the positives should be considerably over-printed, then toned in the gold bath and fixed with hypo., without regarding the intensity of the dark portions. After being washed, the proofs are put into the reducing-bath, where they gradually tone down, until the details in the shadows come out, and, by producing a general harmony, secure very good positives.

On being removed from this bath, the proofs must be well washed, and even allowed to remain in water some hours before being dried. It is best to operate upon one proof at a time in the cyanide bath.

The cyanide of potassium prevents the formation of sulphide of silver. It is advisable to keep the bath covered up with a piece of glass, to prevent the escape of prussic acid fumes while operating, which are very injurious to the health.

The solution must not be used a second time.

ANTICIPATED REVOLUTION IN POSITIVE PRINTING.

It is stated, on the authority of *Cosmos*, that a distinguished professor of physics, at Venice, who at present does not wish his name to be advertised, has discovered a new process of positive printing and fixing, by means of which proofs completely permanent may be obtained without the use of salts of gold, or hyposulphite of soda; and so rapidly, that twenty proofs can be finished in as little time as is required to produce one by present methods: besides, the economy is so great, that a proof may be obtained at a twentieth of the cost now incurred. It is said that the learned professor will be a competitor for the De Luynes prize, and will execute his manipulations in presence of the committee, and that he will send proofs forthwith, in order that their permanence may be proved. The positive paper upon which he prints possesses the remarkable advantage of remaining sensitive for a considerable length of time. Proofs taken upon it six months after being sensitised, are as beautiful as if taken on the day of sensitising. The toning gives every hue and tone, from deep blue to the black of printing ink.

TRANSFERRING COLLODION NEGATIVES TO WAXED PAPER.

The method proposed by M. Toulouse, and recently published in this journal (vol. iv. p. 15), for transferring collodion negatives to waxed paper, has excited so much interest among our readers, that we are induced to refer to it again. To the photographic tourist it is invaluable, inasmuch as it enables him to dispense with the greater part of the most cumbrous and fragile portion of his baggage. A negative, varnished or unvarnished, on collodion or on collodio-albumen, can be transferred in a very short time to waxed paper without being reversed.

Many attempts have been made, with more or less success, to transfer the collodion film, almost all of which consist in making the film adhere to a sheet of paper covered with some adhesive substance, such as gum, gelatine, &c. But these methods present a very great objection, inasmuch as the film is completely reversed. The back becomes the front, left is right, and right is left. In landscapes this change becomes a total sacrifice of truth, and in a portrait, it is simply intolerable. In fact, the old methods of transferring were so little esteemed, that we do not remember to have seen any of them practically adopted by any photographer.

M. Toulouse's method is entirely different: it permits of our transferring positives without reversing them. It is applicable not only to negatives recently taken, but to those which have been taken any length of time. It is true, the manipulation is more difficult with a varnished negative, but the difficulty is not so great but that it may be successfully overcome in the hands of a practical operator; and if the negative has been covered with white lac-varnish, no difficulty whatever presents itself.

The negatives may be transferred to ordinary paper, which may be waxed afterwards, but there is some risk of losing the negative by this method, in consequence of the unequal expansion of the paper tearing the film, and falling from the paper altogether.

In case the negative is varnished, it is found preferable to submit it to the action of steam from hot water rather than to the water itself: if the negative, after being submitted to steam, looks dull and white, *bloomed*, it is only necessary to moisten it with alcohol to restore its lustre, and then cover it with a film of gum-water.

Collodio-albumen plates are more difficult to manage than plain collodion, on account of their elasticity. It is advisable to soak plates of this kind in a solution of potash, of the strength of ten per cent., and afterwards wash off the potash with water acidulated with acetic acid; then rinse well, and proceed as usual.

Dictionary of Photography.

Objective.—The name given by French opticians to the various combinations of lenses employed in portrait and landscape photography. It is so useful a word, that it is well worth adopting into our scientific vocabulary, seeing that we have but one word to express either a simple or a compound lens, or a combination of lenses. The conditions which ought to be united in a good objective are—1. That the chemical and visual foci occur in the same plane. 2. That the axial spherical aberration be destroyed. 3. That the spherical aberration of oblique rays be also destroyed. 4. That the two last conditions must be secured not only for the mean rays, but also for the extreme rays of the spectrum. 5. That the focal surface for distant objects must be plane. 6. That the image must be a perfect representation of the object, without any deformity whatever. The conditions 1 and 2 and 5 and 6 are more important than 3 and 4: these latter are even neglected in objectives with large lenses, which admit of considerable amplification. In this respect, it is true, this is compensated for relatively to condition 3, by the fact that we never make use of any rays except those but slightly oblique to the axis. As to the conditions 5 and 6, they are peculiar to objectives for photography, because we employ a considerable portion of the focal surface, which necessitates our taking as good account of the oblique rays as of those parallel to the axis. Now analysis shows that, the first condition being fulfilled, we can only realise theoretically the two latter, by supposing, at a certain distance in front of the objective, a distance the value of which can be determined by calculation, a diaphragm more or less small, which results in making the edges of the lens only serve for oblique rays, while the centre serves only for those distinctly parallel to the axis. The curves which must be given to the two lenses are connected with this distance, and calculated from it. By this artifice the foci of the oblique rays are received in the same plane as those of rays nearly parallel, and the oblique aberrations, which cannot be entirely destroyed, become almost imperceptible. With respect to the size of the diaphragm, and the diameter of the objective compared with its focal length, it may be said that their determination rests more on practice than on theory. The rule is—the aperture of the diaphragm to be $\frac{1}{40}$th, of the lens $\frac{1}{5}$th, and the image $\frac{3}{5}$ths of the focal length; the distance of the diaphragm from the lens a little less than $\frac{1}{3}$rd the focal length. If, therefore, the focal length be 20 inches, the diameter of the lens will be 4 inches, the diameter of the opening in the diaphragm $\frac{1}{2}$ inch, size of the picture 12 inches, distance of diaphragm from lens 6 inches.

Object Glass.—In a compound lens or objective of a telescope, the *object-glass* is the lens placed next to the object to be viewed; next comes the *field-glass*; and lastly, the *eye-piece*.

Optical Centre.—Every single lens has a certain point called its *optical centre*. In an achromatic lens, or combination of lenses, no such point exists. If it be a double convex lens, it falls within the glass; if it be a plain convex lens, it is at the centre of the face of the back surface; in a meniscus lens, it is without the glass, and behind it.

Optical Glass.—The qualities generally considered as constituting excellence in glass for ordinary purposes may be easily obtained; but in glasses intended for optical instruments, the difficulty of obtaining a pure homogeneous material is so great, as to baffle the utmost patience and skill, so that only lenses of very small dimensions can be produced. The difficulty appears to arise from the difference in specific gravity of the several components of the glass. Some melt at a lower temperature than others, and, sinking through the mixture, leave a streak or tail in descending; some decompose or evaporate in a heat required for the fusion of the others, and different substances cool at different temperatures: hence arise discoloration, sweating, threads, globules, striæ, irregular crystallization, which cause irregular refraction by the interruption of the rays of light, and their deflection from the course they ought to pursue. The skill of many eminent scientific and ingenious men having been directed to improve the quality of optical glass, the result is the production of a *metal* immeasurably superior to that which previously existed. In the works of Messrs. Chance, Brothers, & Co., discs of flint have been produced 29 inches in diameter, and of crown glass, of 20 inches.

Orthoscopic.—A term in optics, signifying that the lens so called gives images freer from distortion than those given by other lenses of a different construction. It is the title by which the Petzval lens, as made by Voigtlander, is distinguished from others.

Oxalates.—Combination of oxalic acid with the bases. The oxalates of silver and of iron are those most interesting to the photographer.

Oxalic Acid.—This acid is found in the state of oxalate in large quantities in wood-sorrel and other plants, but is usually obtained by the action of nitric acid upon sugar; hence it is called the *acid of sugar*. It is also produced by the action of nitric acid upon starch, cellulose, and other vegetable matters; hence it is found in considerable quantities in old collodion. It is a white solid body, of a sharp, acid taste, soluble in water and in alcohol. It possesses powerful reducing properties; its solution reduces the salts of gold with great facility. In combination with the alkalies, it yields soluble salts, such as oxalate, and binoxalate of potash (improperly called salts of lemon), soda, and ammonia. It is useful in the photographic laboratory for removing iron moulds from linen, which are a source of annoyance where the salts of iron are employed. As it is a powerful poison, care is required in its use, for it is often taken for Epsom salts. Its effects are best neutralised by copious draughts of water, containing chalk, whiting, or magnesia.

(*To be continued*)

A Catechism of Chemistry.

CHEMICAL AFFINITY—(*continued*).

Q. Is a knowledge of this law of combination in definite equivalents of much importance in chemistry?

A. It lies at the foundation of the modern system of chemistry, and is of the greatest value in every step of any process or reaction. Were it not for the beautiful simplicity of this law, there could be no such thing as quantitative analysis, and without that chemistry would cease to be a science.

Q. How is this?

A. The equivalents of the elementary numbers having once been accurately determined, that of every chemical compound can be readily calculated. Supposing we wished to ascertain the quantity of nitrate of silver present in a certain solution, we have merely to add gradually a solution which will form with the silver an insoluble compound. When this insoluble compound ceases to fall, it is only necessary to see how many equivalents of the precipitant have been used, and from that we know the number of equivalents of precipitate formed, and also of nitrate of silver originally present.

Q. Since these equivalent weights are only relative one to the other, why are such high numbers as 16 for sulphur, and 8 for oxygen, chosen? Why could they not have been equally well expressed by the numbers 2 and 1?

A. Because then the equivalent weights of those numbers which were less than oxygen, would have to be expressed by fractions, which would have been very inconvenient in calculation. The equivalent of hydrogen is, therefore, taken as the unit, and all the others are expressed by relative numbers to this.

Q. Why is hydrogen chosen?

A. Because it has the lowest equivalent.

Q. Mention the equivalent numbers of the more important elements—

Aluminium	Al	=	13·75	Lead	Pb	=	103·5
Antimony	Sb	=	122	Magnesium	Mg	=	12
Arsenic..............	As	=	75	Manganese	Mn	=	27·5
Barium..............	Ba	=	68·5	Mercury	Hg	=	100
Bismuth	Bi	=	210	Nickel	Ni	=	29·5
Bromine	Br	=	80	Nitrogen	N	=	14
Cadmium............	Cd	=	56	Oxygen	O	=	8
Calcium	Ca	=	20	Phosphorus	P	=	31
Carbon..............	C	=	6	Platinum	Pt	=	98·7
Chlorine	Cl	=	35·5	Potassium	K	=	39
Chromium	Cr	=	26·7	Silicium	Si	=	14
Cobalt	Co	=	29·5	Silver	Ag	=	108
Copper..............	Cu	=	31·75	Sodium...............	Na	=	23
Fluorine	Fl	=	19	Strontium	Sr	=	43·75
Gold	Au	=	197	Sulphur	S	=	16
Hydrogen...........	H	=	1	Tin	Sn	=	59
Iodine	I	=	127	Uranium	U	=	60
Iron...	Fe	=	28	Zinc	Zn	=	32·75

Q. Describe the principles of the chemical notation adopted in the construction of formulæ.

A. Every elementary substance is represented by a symbol, consisting of the first letter of its Latin name, or in cases where more than one element has the same initial, the second distinguishing letter is also used. Moreover—and this is an important point—the symbol does not express the element indefinitely, but *one equivalent* of the element. In the table above given, the symbols as well as the equivalents of the elementary bodies are given.

Q. Then, when Ag is written, it means 108 parts of silver?

A. It does.

Q. Can compound bodies be represented symbolically?

A. They can, and in this consists the great beauty and value of this system of nomenclature.

Q. Mention has formerly been made of the compounds sulphuric acid, potash, &c. How are these represented symbolically?

A. Sulphuric acid being a compound of one equivalent of sulphur and three equivalents of oxygen, would be represented in symbols by $S+3O$ or, as it is more customary to write it, SO_3; and potash being composed of one equivalent of potassium and one of oxygen, would be expressed by the symbols KO.

Q. How, then, would sulphate of potash be written, that being the compound formed by the union of sulphuric acid and potassa?

A. Sulphate of potash is written $KO.SO_3$.

Q. Why is it not written $KO+SO_3$?

A. Because the sign plus is usually considered to represent a less intimate union than is expressed by a dot or a comma.

(*To be continued.*)

THE INSTINCT OF APPETITE.

Chemical analysis and physiological research have established, beyond dispute, that every article of food and drink is composed of elements differing in quantity or quality. It is equally true that the various parts of the human frame are different in their composition, as the bone, the flesh, the nerve, the tendon, &c. But there is no element in the human body which is not found in some article of food or drink. A certain normal proportion of these elements, properly distributed, constitutes vigorous health, and forms a perfect body. If one of these elements be in excess, certain forms of disease manifest themselves; if there is not enough, some other malady affects the frame. When the blood contains less than its healthful amount of iron, it is poor, watery, and comparatively colourless; the muscles are flabby, the face pale, the eyes sunken, the whole body weak, the mind listless and sad. If the bones have not enough lime, they have no strength, are easily bent, and the patient is rickety; if there is too much lime, then the bones are brittle, and are broken by the slightest fall or unusual strain. The highest skill of the physician in these cases consists in determining the excess or deficit of any element, and in supplying such food or drug as will meet the case; when the medical attendant cannot determine what is wanting, nor furnish the supply, Nature is often loud enough in her calls, through the tastes or appetites, to indicate very clearly what item of food or drink contains the needed elements; this is the "Instinct of Appetite." Chemistry is unable to say of but one article of human food, that it contains all the constituents necessary to supply the human body with every element requisite for its welfare, and that is pure milk, as supplied by the mother of the new being; but after the first years of life, the body demands new elements, in order to enable it to meet the duties which increasing age imposes; hence, nature dries up this spring, as being no longer adequate, and compels the search for other kinds of sustenance, showing that milk is a proper sole food for the young ones; and healthy-grown persons who live upon it mainly will always become invalids.

All kinds of life, whether vegetable or animal, have within them a principle of preservation, as well as of perpetuity; were that not the case, all that breathes or grows would die; this principle or quality is common to man and beast, and all that springs from root or seed; it is named "Instinct." It is instinct which calls, by thirst, for water, when there is not fluid enough in the system. It is instinct which calls for food, by hunger, when a man is weak and needs renovation. It is curious and practically valuable as a means for the removal of disease, to notice the working of this instinct, for it seems to be almost possessed with a discriminating intelligence; certain it is, that standard medical publications give well-authenticated facts, showing that, following the cravings of the appetite, the animal instinct has accomplished far more than the physician's skill was able to do; has saved life in multitudes of cases, when science had done its best, but in vain.

About three years ago, the little daughter of a farmer had a fall, which induced a long, painful, and dangerous illness, ending in blindness; medication availed nothing. By accident, a switch containing maple buds was placed in her hands, when she began to eat them, and called earnestly for more, and continued to eat them with avidity, improving, meanwhile, in her general health for some fifteen days or more, when this particular relish left her, and she called for candy, and, as in the case of the buds, ate nothing else for two weeks, when this also was dropped, a more natural taste returning with returning eyesight and usual health. This was instinct calling for those articles of food which contained the elements the want of which laid between disease and recovery.

A gentleman, aged thirty-six, seemed to be in the last stages of consumptive disease, when he was seized with an uncontrollable desire for common table salt; he spread it in thick layers over his meat, and over his bread and butter; he carried it in his vest pocket, which was daily emptied by eating a pinch at a time. He regained his health, and remained well for years afterwards.

More recently, a case occurred of a child gradually declining in health, in spite of all that could be done by a remarkably shrewd and observant physician. On one of his visits he found the father sipping a glass of toddy. The thought occurred to the doctor to offer some of it to the child, who took it with great satisfaction. The hint was improved; more was given, and more; and for two months this child of two years old lived almost wholly on whisky-toddy, when the desire declined, a more natural appetite returned, the health improving every hour, and was eventually entirely restored; but ever thereafter the child loathed the very smell or even sight of whisky-toddy.

A similar case is reported where a sick child took a pint of ale daily, and nothing else for many days, ultimately recovering, when the sight of an ale bottle could not be endured. The child of respectable parents was supposed to be dying of diarrhœa. As a last and desperate resort, it was hurried off to R—— in August, having the (usually considered fatal) hiccough when it started. Immediately on its arrival, on a cold, raw, chilly evening, about an hour after sunset, some fresh milk from the cow was instantly boiled and offered to it. It was with difficulty that the bowl could be withdrawn from its poor emaciated fingers. After an hour's interval more milk was given, and nothing else, for a number of days. That child is now one of the heartiest, healthiest girls in ——

In the cases above given, the children could not name their cravings; but accident threw in their way what the instincts required. Grown persons can express their cravings. There are many persons who can record, from their own personal experience, the beginning of a return to health from gratifying some insatiate desire. The celebrated Professor Charles Caldwell was fond of relating in his lectures, that a young lady, abandoned to die, called for some pound-cake, which "science" would have pronounced a deadly dose; but as her case was considered hopeless, she was gratified and recovered, living in good health afterwards. But in some forms of dyspepsia, to follow the cravings is to aggravate the disease, life is made intolerable, and suicide closes the scene. In low fevers, typhoid, yielding to the cravings, is certain death.

To know when and how to follow the instinct of appetite, to gratify the cravings of nature, is of inestimable value. There is a rule which is always safe, and will save life in multitudes of cases, where the most skilfully "exhibited" drugs have been entirely unavailing. Partake, at first, of what nature seems to crave, in very small quantities; if no uncomfortable feeling follows, gradually increase the amount, until no more is called for. These suggestions and facts find confirmation in the large experience of that now beautiful and revered name, Florence Nightingale, whose memory will go down with blessing and honour side by side with that of the immortal John Howard to remotest time. She says:—"I have seen, not by ones or tens, but by hundreds, cases where the stomach not only craves, but digests things which have never been laid down in any dietary for the sick, especially for the sick whose diseases were produced by bad food. Fruit, pickles, jams, gingerbread, fat of ham, of bacon, suet, cheese, butter-milk, &c., were administered freely, with happy results, simply because the sick *craved* them."

Photographic Chemistry.

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ADULTERATION OF NITRATE OF SILVER.

Nitrate of potassa is the substance generally employed in the adulteration of nitrate of silver. The simplest test of the purity of the silver salt is, to dissolve a small quantity in distilled water, and add hydrochloric acid in excess. Chloride of silver is precipitated, and the clear supernatant liquor, if evaporated to dryness on a slip of platinum, leaves no residue if the nitrate of silver be pure.

CYANIDE OF POTASSIUM.

The deleterious properties of this photographic fixing agent are so great, that any attempt to make light of them merits rebuke. We regret to see that even accomplished chemists, familiar with its dangers, are but too ready to underrate its poisonous qualities; but it should be considered that the majority of the persons who practise photography are ignorant of the properties of most of the chemicals they make use of. Perhaps it would be asking too much to require that cyanide of potassium be banished from the list of photographic chemicals. It is one of the most violent poisons, and, in spite of all the precautions that may be taken in using it, it is, nevertheless, dangerous: even the vapours given off can alone occasion very serious accidents to the human economy. The list of victims, both accidental and wilful, is truly formidable.

There can be little doubt that the violent headache with which photographic operators are frequently troubled, and which is attributed to other causes, is due to the cyanide of potassium. If we employ solution of cyanide in the laboratory, where we are compelled to pass the greater part of the day, it is seldom that we escape indisposition, which sometimes lasts several days; and this illness is very frequently attributed to ether, collodion, &c., when, in fact, it is due only to the cyanide.

There is risk of being poisoned, if the cyanide be absorbed, by the slightest scratch or abrasion of the skin; absorption takes place very rapidly, and then the following symptoms exhibit themselves. The head feels heavy, with strong pressure about the temples; the appetite fails; we experience violent contraction of the limbs; the legs fail, and the whole system is depressed. The best restorative is a strong infusion of coffee, of the strength of two or three ounces to the pint of water; no milk to be added: in the absence of coffee, some other stimulant of the nervous system is required. But, as prevention is better than cure, it will be most desirable that the cyanide of potassium should be banished from the photographic laboratory altogether from any but experienced chemists.

PURIFICATION OF HYDROCHLORIC ACID.

It frequently happens that commercial hydrochloric acid contains sulphurous acid, or free chlorine. These two impurities are removed, by simply passing a current of carbonic acid gas through the impure acid; the sulphurous acid and chlorine are driven off without any diminution of strength in the acid. In the preparation of pure hydrochloric acid, it often happens that, at a certain moment during the operation, we obtain an acid which is first yellow, then of a reddish brown: now this acid bleaches spontaneously by a superabundance of hydrochloric acid gas, and the colour disappears in the second receiver. But when the bleaching is not complete, it is only necessary, in order to bleach it entirely, to pass through during twenty or thirty minutes, according to the quantity of acid, a sufficient quanty of carbonic acid gas, and it becomes completely bleached.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, *4th June*, 1860.

Before giving you the little photographic and scientific news I have collected since my last letter, I intend saying a few words concerning the present month, being that in which the sun gives our countries the greatest quantity of calorific and actinic rays.

According to an ancient authority, Fulvius Nobilior, it happened that the first king of Rome, Romulus, after having divided his people into two classes, the old men (*majores*) and the young (*juniores*), gave, in their honour, the name of *Majus* to the third month of his year, and that of *Junius* to the fourth. We are told, however, by Cincius, that in Latium June was called *Junonius*, a temple having been erected to the goddess Juno in that month, and that this word soon became *Junius*, by abbreviation. There are other opinions, but I shall not examine them here.

Throughout this month the mean temperature of the air gradually increases. The sun continues to go further from the equator until the 21st, after which date it begins again to approach the line. The sun's meridian height is therefore greatest on the 21st of June, in our latitudes. On that day its rays fall upon the earth with the least possible degree of obliquity. This constitutes the summer *solstice*. The ancients, seeing that at this period the sun neither moved north nor south, but appeared to stand still for a day or two, designated the phenomenon by two Latin words, *sol stat*, whence came our English word *solstice*.

On the 1st of June, when the sun passes the meridian, a well-regulated watch ought to mark 11h. 57′ 34″. Thus, if we have at our disposal on that day a good sun-dial, we can obtain with accuracy the mean time.

The length of the day during this month, and its prolongation by the crepuscular light of the evenings, are remarkable. The atmosphere is generally saturated with moisture, owing to the great evaporation of water on the surface of the earth during this period of increasing heat. The month of June is not favourable for astronomical observations, on account of the large amount of diffused light remaining in the air during the greater part of the night, owing to the sun descending so small a distance below the horizon. As soon as evening comes on, the sky is frequently covered with a thin, fleecy layer of clouds, behind which the stars shine dimly, and appear far less bright than in winter.

The month of June is also remarkable for the small number of meteors, or shooting stars. Falls of aërolites have been only twice noticed during this month, viz.:—in the year 36 (on the 24th June), and in the year 1022 (from the 28th to the 30th).

Some of our French papers talk of a certain M. Hubert, who, strolling down one of the streets of Venice, happened to meet with a professor of physics. The latter, whose name is not mentioned, is in possession of a new process of fixing photographic images, without employing hyposulphite or salts of gold; and the proofs obtained by this process are as unchangeable as carbon proofs. The author has sent some to the French Photographic Society, that the members may experiment upon their stability. He is going to present himself as a competitor for the remaining part of the prize of the Duc de Luynes; so that we shall soon expect to hear more about this new process. Until then, I shall certainly not speak of the wonderful cheapness and other remarkable properties of the process used by this Italian professor, which, according to some papers, is destined to produce a revolution in photography.

It appears that gutta percha contains a resinous principle which is soluble in acetic acid, and possesses the remarkable property of rendering salts of silver insensible to the action of light. This discovery is attributed to Professor Draper, of New York; it appears to me a photographic paradox. Dilute acetic acid, containing its own volume of water, dissolves nothing from gutta percha.

M. Mathieu has just brought out the volume of the *Connaissance des Temps* for 1862, published by the Bureau des Longitudes. This new volume contains a great deal of new matter, and will be found more useful to sailors and astronomers than the previous one.

M. Debray having invented a new process for extracting sugar from the beet-root, based upon the use of acetate of lead, demanded the opinion of the Academy of Sciences. To-day we have a report upon this subject, read by M. Payen of the Institute. Thenard showed, long ago, that *tribasic acetate of lead* precipitated various organic substances which accompany sugar in its solution, without precipitating the latter; and M. Debray's process is nothing more than an application of that discovery. The Academy have, however, rejected it altogether, as being a poisonous and dangerous method.

A long paper has lately been read at the Academy of Sciences by M. Eschricht, a learned naturalist of Copenhagen, showing that whales, with their young, are to be found in the Atlantic Ocean as far south as the Bay of Biscay.

The well-known professor, Andreas Retzius, who occupied the chair of anatomy and physiology at Stockholm, is gone from among us, aged 64 years. He was the son of the celebrated Professor Retzius of Lund, and has produced many esteemed works on anatomy and physiology; among others, a description of the crania of the different Scandinavian races.

Proceedings of Societies.

PHOTOGRAPHIC SOCIETY OF LONDON.

THE ordinary monthly meeting of this Society took place on Tuesday evening, June 5, at King's College; H. WHITE, Esq., occupied the chair.

The SECRETARY said, two photographs had been presented to the Society by Mr. Denier, of St. Petersburg, an European artist of acknowledged standing in this branch of the art. He was desirous of making his talent known in England, and his great ambition was to become an honorary member of this Society. The pictures were beautiful specimens of photography.

A letter was also read from Captain Thomas Biggs, of the Bombay Artillery, inclosing some specimens of prints of foliage taken by the calotype process. The chemicals, he said, were not so good as in this country; and, in India, foliage was difficult to get, on account of it never being still. The pictures must be taken at about 9 A.M., and the time of exposure was therefore increased. Thomas's collodion, he remarked, was the only kind he could depend upon in Bombay. The difficulties of travelling rendered the processes of photography very unsatisfactory when moving about.

Mr. DALLMEYER then read a paper on the nature of distortion, as produced by the present forms of view lenses, and on a combination of lenses free from this defect, but our report of which we must postpone till next week.

The CHAIRMAN said, the subject was a most interesting one, and one that had not been gone very deeply into by most photographers; and he felt sure that their best thanks would be given to Mr. Dallmeyer for the paper which he had been good enough to bring before them. As this was the last meeting of the season, he wished them all a very pleasant and happy vacation. (Applause.)

The meeting then separated.

Miscellaneous.

THE MAGNESIAN LIGHT.—Magnesium is well known as the metallic basis of magnesia; it is much lighter than aluminium, as its specific gravity is only 1·74; it is of a silvery whiteness, undergoes no change in dry air, and is subject to but slow oxidation in a damp atmosphere, and that only quite superficially; it may be hammered, filed, and drawn into threads. At the beginning of the present century its properties were developed by Davy, and still more thoroughly by Busse. To obtain it pure is an expensive process; and as no practical advantage could hitherto be made of it, no one had attempted to discover a cheaper method of getting it. It was reserved to Bunsen to perceive a new property in this metal, and to suggest a practical application of it. Magnesium takes fire at the temperature at which glass melts, and burns with a steady and extremely vivid flame. In some photo-chemical investigations by Bunsen and Roscoe, experiments were made to test the illuminating capacity of a magnesium thread, when Bunsen discovered that the splendour of the sun's disc was only 524 times as great as that of the thread. Bunsen also compared the magnesium flame with ordinary lights, and found that a burning thread of 0·297 millimetres diameter produces as much light as 74 stearine candles, of which five go to the pound. It is plain that it only needs a mechanical device to spin magnesium when heated into the form of a thread upon spools, from which they can be run off like the strips of paper in Morse's telegraphic apparatus, to render it of practical use. Such a magnesium lamp-wick would be far more simple and complete than the preparations for the use of the electric or the Drummond light. A spool with its thread, a clock-work to wind it off, with the spirit lamp, would be easily transportable. A rival, therefore, to the strong lights hitherto used is like to spring up in Bunsen's magnesium-lamp, in all those cases where the item of expense is likely to be slightly regarded, for example, in brilliant illuminations, light-houses, &c., for extraordinary degrees of illumination may be obtained by burning several of these threads of large dimensions at once. In photo-chemic experiments and in photography, the excellence of the magnesium-light is most conspicuous, as, according to Bunsen's estimate, the photo-chemic power of the sun is but 36 times greater. It can, therefore, be used with great advantage in photographing by night, or in dark subterranean apartments. For the photographer, notwithstanding the high price of the magnesium thread, it can already be turned to account, by reason of the shortness of the time during which the thread needs to be kept burning.

BUSSON'S NEW PROPELLER FOR STEAM BOATS.—A model steam-boat, furnished with M. Busson's new propeller, is now exhibiting in one of the reservoirs at the Arsenal, behind the column of July, at Paris. The boat is constructed of iron, about 16 feet in length, 4 feet in breadth, drawing, when loaded, 4 inches of water. With five persons on board, it was impelled with a velocity of five miles an hour; the motion being regular and gentle, and the swell very trifling. The inventor, struck with the idea that both paddles and screw propellers act by repulsion in pressing, as it were, on the water, which gives way before them, and by which much force is neutralised, he sought to discover if it were not possible to invent a new motor, which, instead of pushing the boat forward, should act by suction, grappling with the water just where it finds the resistance overcome, and so open a passage for the hull of the vessel by creating a vacuum in front and on the sides, causing the pressure from behind and around to act as a motive power to the floating or immersed body. The motor, which the inventor calls the *conical turbine*, is a propeller of a conical form, large at the base and sharp at the summit; the flanks are slightly curved, like the sails of a windmill, and carry several helicoidal blades. When made to revolve, the turbine acts like a screw, and drives before it the water, which it penetrates and sucks up, while the left lateral surfaces project the water sucked up circularly. From the double action of the screw and the left surfaces, assisted by a border suitably rounded, there results a strong suction equivalent to a vacuum more or less complete. Freed from all pressure in front, and constantly impelled behind by the pressure of the height of water in which it floats, the boat darts forward. M. Busson has placed a small high-pressure steam engine of half-a-horse power in his boat, which exercises a pressure of about 25 pounds on the shaft, making the turbine revolve sixty times in a minute. The manometer marks a pressure of 4 to 5 atmospheres. The boat obeys the helm promptly, turning within its own length. In backing, the turbine acts as a screw, but with much less velocity. With the ordinary screw fitted to the model-boat, and the same engine, it was found absolutely impossible to obtain the same velocity as with the turbine.

NORTH ATLANTIC TELEGRAPH.—The "caution-money" of £20,000 on the concession of the North Atlantic Telegraph between Europe and the United States, for 100 years, granted by the Danish Government, is stated to have recently been remitted to the Danish Minister of Finance at Copenhagen, by Messrs. Croskey and Co. The line will proceed from Scotland and Denmark, *via* the Faroe Islands, Iceland, Greenland, and Labrador, to Canada and the United States; and its practicability is represented to have been recently demonstrated by a personal survey made by Colonel Shaffner, who, a short time since, gave evidence upon the subject before the House of Commons.

NEW ELECTRICAL MACHINE.—An electrical machine has been constructed in Paris, by an American, so powerful that it readily evolves electric sparks fifteen inches long. It charges an ordinary Leyden jar three times a minute, the discharge being as loud as the detonation of a musket. An observer writes:—"When the distance between the poles had been reduced to a single inch, producing an apparently continual electric current, I touched a cigar to the flame, literally igniting it by lightning. The experiments were conducted by Professor M'Cullough, of Columbia College, New York, and M. Foucault, of the Paris Observatory. It is probable that this machine, a triumph of American productive industry, will be purchased by the French Government for the Polytechnic Institute."

CHAMELEON MINERAL.—The permanganates and manganates of potash and soda form this rare mineral, which is distinguished as a rapid oxydising agent. When dissolved in water, it appears of a greenish hue at first, then it becomes purple, and subsequently a beautiful red. It is used for deodorising, and, occasionally, as a medicine. Its chief use has been as an oxydising substance; its extreme delicacy rendering it valuable in analytical chemistry. Hitherto it has been very high in price, and it could not be manufactured in large quantities. Quite recently, Mr. W. Wildsmith, analytical chemist, of Wolverhampton, has succeeded in manufacturing it upon a large scale, and at a price less than one-half of that at which it has hitherto been sold.

Sleeping under the Clothes. — There is reason to believe (says Miss Florence Nightingale) that not a few of the apparently unaccountable cases of scrofula among children proceed from the habit of sleeping with the head under the bed-clothes, and so inhaling air already breathed, which is further contaminated by exhalations from the skin. Patients are sometimes given to a similar habit; and it often happens that the bed-clothes are so disposed that the patient must necessarily breathe air more or less contaminated by exhalations from the skin. A good nurse will be careful to attend to this. It is an important part, so to speak, of ventilation. It may be worth while to remark, that when there is any danger of bed-sores, a blanket should never be placed under the patient. It retains damp, and acts like a poultice. Never use anything but light Witney blankets as bed-covering for the sick. The heavy, impervious cotton counterpane is bad, for the very reason that it keeps in the emanations from the sick person, while the blanket allows them to pass through. Weak patients are invariably distressed by a great weight of bed-clothes, which often prevents their getting any sound sleep whatever.

New Theory of Ozone.—M. Schoenbein has found that there are two species of ozone—the one electro-positive, the other electro-negative—both of which exercise a very energetic chemical action. When combined, they mutually neutralise each other, and form ordinary oxygen, considered as an inactive or neutral body. In other words, all chemical actions which hitherto have been attributed to oxygen will, by this new theory, be reserved to these two kinds of ozone, which may cause reaction so long as they remain isolated, and lose all action when united to form ordinary oxygen, which is disengaged in certain reactions.

New Photographic Apparatus.

To the Editor of the "Photographic News."

Dear Sir,—I have much pleasure in sending herewith a description, with sketches, of a new plate box I propose for tourists, as combining great portability with cheapness and cleanliness.

I have three in use myself, which I find invaluable when taking plates out on a journey, &c.

Should the idea meet with your approval, you are at liberty to make what use you please of it, and believe me to be yours truly, Persevere and Prosper.

The materials required for making a half-plate box are as follow:—

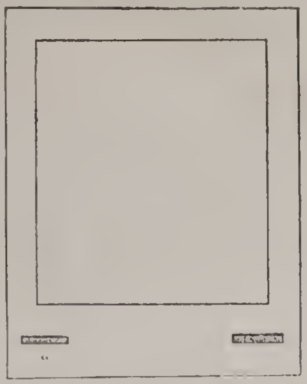
A few sheets of "tip" board.
A solution of *pure* sheet gutta-percha in chloroform.
A *strong solution* of gum arabic.
About four inches of elastic webbing.
Two pieces of deal, ⅛in. thick, 6¾ × 4¾, and a piece of bookbinder's cloth.

Having procured the above necessaries, first cut a sheet or two of tip into pieces 6¾ × 4¾, then cut the centre out, leaving only a rim of about $\frac{3}{16}$ths of an inch on three sides, and half an inch on the fourth, A.

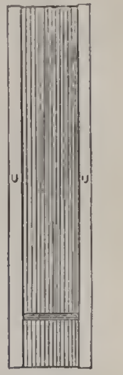
Then with a chisel (or knife) cut two parallelograms out of the bottom *a a* of the frames, of the same length as the width of the webbing, and about $\frac{1}{16}$th of an inch in breadth, and ¼ of an inch from the bottom.

Prepare your solutions of gutta-percha and of gum, and dip each of the frames first into the gum, and when dry, into the gutta-percha. (The object of the gum is to harden the millboard.) Repeating this process improves them.

Now insert the webbing through the parallelograms, and glue the ends to the outer frames.



A

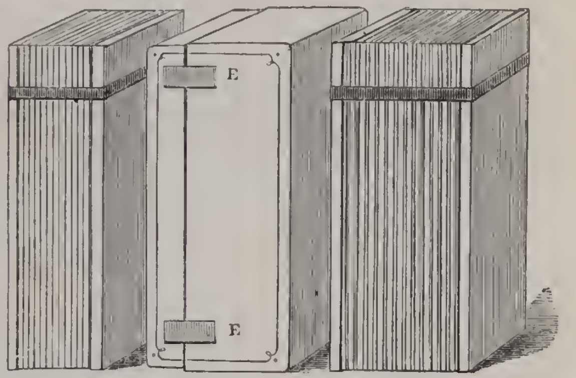


B

SECTIONAL VIEW.

Then take the two pieces of millboard and glue one into each outer frame, c c in B.

To make them look neat, cover them with the cloth, and pass a common elastic band over the whole, and the box is complete. When empty the box (to contain 12 plates) is about 1in. thick, and double that when full. It is much safer than the ordinary plate-box, which is apt to tear the film in placing the glass in the box.



C

BOX EMPTY. LEATHER CASE EXPANDING. BOX FULL.

The leather case is composed of an outer and an inner case, joined together by two pieces of elastic webbing, E E.

The only objection to it is, that it takes some time to make (each of mine took me six hours), but this is amply compensated for in its great convenience. Moreover, any one with a knife and glue-pot can make them with ease.

I have outer leather cases with elastic sides for mine (made for me by Letts, of the Royal Exchange), for the sake of convenience, but this is not *necessary*. C represents one of them.

Photographic Notes and Queries.

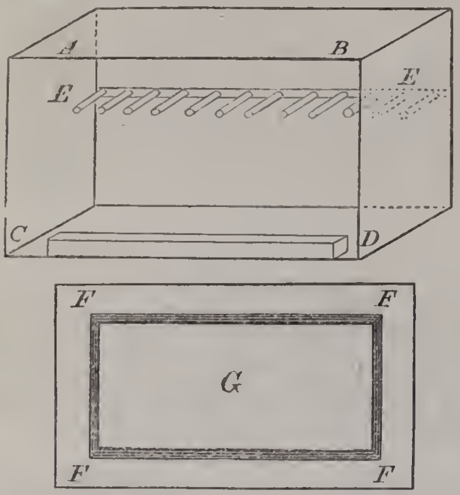
PHOTOGRAPHS ON PORCELAIN.

Sir,—I have lately seen some specimens of "burnt-in" photography on porcelain and glass, and observe in them a strange error of judgment in the choice of subjects so applied, which I think deserving notice and condemnation. For instance, a copy of Ary Scheffer's beautiful picture of "Dante and Beatrice" is applied to a vase; consequently, the upright, graceful figure of the poet and his "donna" are contorted into utterly impossible positions, out-heroding any achievements of acrobats I ever witnessed. Pictures can only be properly represented on plain surfaces: even when applied to cylindrical surfaces, they offend taste. For the fantastic forms of vases, &c., the subjects best adapted are flowers, with their twining stems and foliage, which readily follow the forms of Nature—trunks of trees, &c.—not only without distortion, but even with additional grace. I trust this hint will not be thrown away upon those interested. Ceramicus.

May 29, 1860.

DRYING SENSITIVE PLATES.

Sir,—The inclosed sketch may probably be useful to some of your readers who, like myself, have been puzzled for an effectual means of drawing and drying their sensitive plates.



A B C D, Mahogany box 24 in. × 12 in. × 6 in.
E E, Rails for supporting prepared plates.
F F F F, Shutter or door sliding in a groove.
G, Yellow glass.
H, Narrow gutta-percha dish.

The bottom of this box is to be covered with blotting-paper, and is capable, according to the above plan, of drying 12 stereo. plates, the tops of which rest or lean against the rails E E, which should be made of glass tubing, as wood will stain the plates; a narrow gutta-percha dish should be placed inside the box—between the plates and the shutter—in which should be kept a little sulphuric acid, to absorb the moisture from the plates. Thomas Clarke.

2, *Ordnance Terrace, Shooter's Hill, June* 1, 1860.

BUBBLES ON DRY COLLODION PLATES.

Sir,—"P. D. C." would be much obliged if some of your readers could inform him how to avoid the bubbles on his dry collodion plates; can it be owing to his having had them some time? He follows the full directions given by the Patent Dry Collodion Plate Company, and yet he fails; he cannot make pictures, as, when he takes the plate out of the distilled water bath, it is covered with the above-named bubbles. As he is now travelling about, he would be grateful for an answer, as he cannot at present use his plates.

⁂ We have the same inquiries from several correspondents.

POSITIVE COLLODION.

Sir,—Having tried some collodion prepared according to a formula given by "Oxoniensis," in No. 75, page 276, which has answered my purpose well, I would ask that gentleman whether he could oblige with an equally good formula for positive collodion? —Apologising for troubling you, I remain, sir, yours respectfully, Inquisitive.

THE TRUE DISCOVERER OF PHOTOGRAPHY.

Sir,—It is a notable fact that we are indebted to Lord Brougham for the discovery of the principle of photography. In that profound philosopher's recently-published mathematical and physical tracts, it is stated that one of the papers on light and colour had been published in the *Philosophical Transactions* for 1796, but with omissions from the manuscript he sent in to the Royal Society. These omissions contained remarks on the effects resulting from exposing a plate of ivory, moistened with nitrate of silver, to the rays of the sun passing through a small aperture into a dark room. The Secretary, Sir C. Blagden, did not consider these facts as belonging to pure science, and withheld their publication. Had they appeared, they might have led to the discovery of photography fifty years before Talbot and Daguerre. Photos.

THE CAMERA A PEEP-SHOW.

Sir,—I think your correspondent, "Spx" (No. 91), is not aware of the fact that he is suggesting the convertibility of a camera into a magic lantern, "with a difference." His photograph is the slide, and the focussing-glass the screen to receive the enlarged picture. Now, although we can determine true focus by looking upon this picture, a very little reflection must convince us that it is not of a nature to bear amplification by a cosmoramic glass. No peep-show will ever surpass the well-known *diagonal machine,* in which a strongly-illuminated picture, lying horizontally, is received on a plane mirror, at an angle of 45 degrees, and viewed through a glass of shallow curve and large surface. These conditions are the best that can be imagined for effects that depend on illusory distance and enlargement of the angle of vision. Thomas Rose.

Glasgow, June 5, 1860.

MEETINGS OF PHOTOGRAPHIC SOCIETIES.

Wednesday, June 13—Chorlton Photographic Society.
Monday, ,, 18—Blackheath Photographic Society.
Thursday, ,, 21—South London Photographic Anniversary.

TO CORRESPONDENTS.

Errata.—In Mr. Dawson's remarks at the North London Photographic Society, published last week, for "chloride of silver was slightly soluble in chloride of soda," read, "in chloride of *sodium;*" and for "decomposing hyposulphite of silver or sulphite of silver," read, "*sulphide* of silver."

Glasguensis.—The means of recovering silver from old baths have been frequently described in this journal. Six ounces of chloride ought to produce four and a half ounces of pure silver. Mix the dried chloride with three and a half ounces of chalk, or whiting, and two drachms of powdered charcoal, mix, and put into a clay crucible, and expose to a red-heat for half-an-hour at least. Allow it to become quite cold, then break the crucible, and the pure silver will be found at the bottom. Your refiner's experiment is quite inexplicable; his explanation is unsatisfactory. We have not received the letter you allude to. The address is to the Secretary, 33, Cornhill, E.C.

W. Crum.—1. It is not necessary to gelatinise the negative paper. 2. Bromide of iodine is prepared by saturating a solution of bromine with iodine, and taking ten minims of this solution and adding to it a pint of filtered river water. 3. You do not say what stains. Perhaps cyanide of potassium, if carefully applied, in a diluted state, will answer. 4. Any good paper process will keep undeveloped a few hours, but none weeks, that we are acquainted with.

Gallic.—To convert the centigrade scale into Fahrenheit, multiply the degrees on the first by 1·8, and add 32 to the product. The total will show the corresponding degree on the Fahrenheit scale. Thus 60° C × 1·8 = 108 + 32 = 140° Fahr. To convert Fahrenheit scale into centigrade, deduct 32 from the former, and divide by 1·8. Thus 140° F. — 32 = 108 — 1·8 = 60° C.

Questant.—1. It is difficult to account for the variation, if all the conditions remained the same. 2. Papier Saxe appears the best in this sample. We have generally found papier Marion preferable. 3. The Spanish white should be put in the dish with the proofs. 4. Spanish white is carbonate of lime, or whiting. Flake white is carbonata of lead, and cannot be substituted for the other.

Querist.—You had better follow Mr. Maxwell-Lyte's suggestion. Dissolve one ounce of pyrogallic acid in four ounces of alcohol. Four minims of this solution represent one grain of dry pyrogallic acid. The solution will keep good, if tightly corked, any length of time.

Juvenis.—You do not require expensive apparatus to study chemistry; twenty shillings judiciously expended will more than suffice. Some of the most important discoveries have been conducted with such simple resources as jam-pots, soda-water bottles, tobacco pipes, &c.

Lawnod?—Re-developing solution is composed of 1 ounce of water, 20 drops of saturated solution of corrosive sublimate in hydrochloric acid, 20 grains of sulphate of iron, 12 grains of nitrate of potash, and ½ drachm of alcohol. Allow it to remain on five to ten minutes.

Doric.—Architectural photography is as wide and as profitable a branch of art to cultivate as portraiture, and even more so, because so few devote themselves to it.

A. W. Hall.—Advertise it, stating particulars, price, and where it can be seen, if possible. There are dealers in second-hand apparatus, who will purchase, or take on sale.

J. C. S., or F. L. C.—The recovery of silver from old baths, and the treatment of residues, have both been fully described in this journal. See Indexes—article, "Residues"

Lux.—The alkaline toning-bath will answer for ammonio-nitrate prints. Common washing soda is carbonate of soda, and will answer as well. The blue colour arises from the proof remaining too long in the toning bath.

J. E. d'Abreu.—The process will be published in the "Photographic News" as soon as the specification of the patent can be obtained.

W. T.—The plate-holder can only be procured in Paris at present. The linseed method will be published shortly.

Francis S. Beatty.—Will you please to state which particular patent you refer to: giving the patentee's name?

Diddler.—Ethereal solution of gold is prepared by dissolving chloride of gold in sulphuric ether.

A Jersey Amateur.—The bath is none the worse for being old, if you have not tamperad with it. Blistering appears to be an incurable disorder.

Oscar.—The article is not patented. You can make one for yourself from the description given.

⁂ All editorial communications should be addressed to Messrs. Cassell, Pettee, and Galpin, La Belle Sauvage Yard, London, E.C.

THE PHOTOGRAPHIC NEWS.

Vol. IV., No. 93.—*June* 15, 1860.

COLOUR IN ITS RELATION TO PHOTOGRAPHY.*

BY CHARLES MARTEL.

The term *colour* is used by artists in what may appear an anomalous sense; that is, it is applied to productions in which, in the common acceptation of the word, there is no colour: and again, where the initiated sees a canvas glowing with all the hues of the prism, the artist will say, "the picture has no colour." Upon a little inquiry, we shall see that in such cases the artist employs the word *colour* in lieu of *chiar-oscuro*. The usual application of the term *chiar-oscuro* being limited to light and shade and their distribution in a picture, a word was wanting which should express not only light and shade, but also the mutual influence of the lights and shades upon each other, which gives rise to a host of modifications of mere light and shade, such as only the accomplished artist can recognise, appreciate, and represent.

In the productions of inferior artists, we constantly see a tolerably due regard paid to light and shade, but a total disregard of chiar-oscuro; hence, their pictures are flat, and, however gaudy they may be, *lack colour*. But in an engraving, or a drawing in Indian ink, or simple crayon, executed with a full knowledge and appreciation of chiar-oscuro, the intelligent artist recognises with delight this completeness, and exclaims, "This work is full of colour," although the uninitiated can see nothing but black and white.

Thus artists, who have painted only in monochrome, have obtained a reputation as good colourists, simply because they have paid due attention to the chiar-oscuro of their subjects.

It is said that the true artist is recognised by his full appreciation of the relative value of tones; and the unskilled painter fails to satisfy the critical eye, because he has attached too much value to *hues*, and too little to *tones*. One of the most important elements in the principles of art taught by photography is this value of tones. A good photograph, although entirely deficient in colour, in the ordinary sense of that term, is, to the connoisseur, full of colour; inasmuch as all the minutiæ of light and shade—complete *chiar-oscuro*—are represented in it.

Colour, in an artist sense, consists of three elements—light, hue (or colour), and tone; and as, in a good photograph, we are always sure of two out of these three elements, light and tone, the third is supplied of itself.

Now, in photographic portraiture, a successful result depends far more upon the sitter being placed in good conditions of chiar-oscuro than upon the mere manipulation. No manipulation, however faultless, no lens, however quick, no developing, however skilful, can ever supply the deficiency arising from placing the sitter in a bad light.

By bad light we by no means wish a feeble light to be understood. What with the perfection of our lenses, the sensitiveness of our collodion, and the perfectibility of manipulation to which experience has brought us, it seldom happens, while the sun is above the horizon, that a tolerable portrait cannot be taken, if due regard be given to the proper distribution of light and shade upon the sitter. We have taken portraits, during heavy storms of rain, when the sky all around was of a dense leaden hue—and again, during the gloom of a London November—which are far more effective than others taken on a fine summer's day, in the open air. And the reason is this: in the cases first instanced, contrivances had been adopted to secure a full amount of *reflected* light upon the sitter; in the second case, there was no reflected light, or so little as to be ineffectual.

The photographer who wishes to succeed in portraiture must study the principles of chiar-oscuro. His first step will be to bring a plaster bust into his operating-room; and, supposing this room to be lighted in the usual manner, by a vertical window, let him place the bust on a pedestal, at the spot where he proposes to place his sitter; then carefully study the distribution of light and shade upon it. The probability is, that he will discover very little—except that of strong contrast—between the side nearest the window and that farthest from it. If he photographs it, the result will be one of those productions facetiously termed "soot and whitewash"—that is, the lights will appear too white, and the shade too opaque and dense; there will be neither tone nor half-tone; there is no chiar-oscuro, because there are no reflected lights.

Now, the remedy for this is, to bring a white curtain or screen near to the shaded side of the bust: how near will have to be determined by experiment. Immediately, the dark side will appear illuminated by a light much less strong than that on the side next to the window; it will be in half-tone, and the various salient portions of the bust will reflect lights of different *tones* or degrees of intensity upon each other, and chiar-oscuro will be produced.

By changing the position of the bust on the pedestal, turning it more or less from the light, the photographer will be able to discover the best position in which to pose a sitter. In the majority of cases this will be a three-quarter face; if the light comes from the operator's right, the sitter's head should turn to the operator's left, and *vice versâ*.

Photographers give themselves much trouble and anxiety about the construction of glass rooms. By giving proper attention to reflected light, we do not hesitate to say that such expensive appliances become unnecessary. Our own experience has been gained in taking upwards of six thousand portraits from sitters placed at the French window of a room looking out into the open country. Upon removing camera, chemicals, &c., into a glass room, we could not for a long time succeed in obtaining a tolerable portrait at all. It was only after a severe trial of patience that we discovered that the defects were due to excess of light—*there was no chiar-oscuro;* the remedy was to inclose the sitter in a box formed of screens, and, by colouring the sides, background, &c., of suitable tones of grey, we obtained the result so much coveted.

Amateurs—who think they cannot have too much light, and, therefore, take pictures in the open air—generally complain of their pictures being too dark in the shadows; the method of remedying this defect is obvious from what has been stated above.

There are parts of the faces of some sitters—those whose features are strongly *chiselled*, such as the orbits of the eyes, the upper lip, under chin, &c.—that may require a light reflected *upwards* from the floor. This can easily be obtained by placing the sitter on a piece of white material, such as linen carpeting; or, if that be found insufficient, a white or blue-papered screen, suitably placed, will throw sufficient light to produce half-tone. If, however, the blue light reflected be too intense, it will overpower the white light, and neutralise the disparity between the direct and reflected light, and, consequently, destroy the chiar-oscuro.

The portrait-photographer has a good many difficulties to contend with in obtaining complete chiar-oscuro in a portrait, owing to the inappropriate costume assumed by his sitters. With the male sex the difficulties to be overcome are but trifling; with the female sex they are sometimes truly formidable. A lady may present herself in the photographer's studio decked in all the gaudy colours of the rainbow—very effective, probably, in a pictorial point of view, but, when translated by the camera, presenting a picture *bizarre* in every respect. In a portrait, the lightest portion of the picture should be the head and hands, the tones becoming deeper as they recede from the central space occupied by the head; the portraits by Titian, Rembrandt, and Vandyck are models in this respect, and may be profitably studied by the photographer in good engravings after these masters. Whenever the photographer is consulted by a female sitter as to the best costume, he should counsel black. A glossy black silk dress displays a beautiful arrangement of light and shade in the photograph; the glossy surface reflecting a considerable quantity of white light, it exhibits sufficient variety of tone to constitute a satisfactory picture. If lace collar and cuffs are added to the costume, they should be as open as possible, by which an effect of light grey is obtained—much preferable to opaque white.

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* Continued from vol. iv. p. 62.

(*To be continued.*)

SCIENTIFIC GOSSIP.

A most important advance in our knowledge of the composition of solar light, and of the constitution of the solar atmosphere, has recently been made by a German physicist, Professor Kirchhoff. His observations have extended over several years, and include a vast number of experiments made with a view to determine the cause of the luminous lines which are visible in the spectra of coloured flames. During this inquiry he made some observations which disclosed an unexpected explanation of the origin of Fraunhofer's lines, and authorise conclusions therefrom respecting the natural constitution of the sun's atmosphere. It has been known for some time that there is to be seen in the spectra of most artificial lights a pair of very fine and luminous lines which coincide to the two dark lines, D, of the solar spectrum. These lines, it is now generally acknowledged, depend upon the presence of sodium in the flame. The professor has found that when a ray of sunlight is allowed to pass through a spirit flame, the wick of which has been moistened with a solution of chloride of sodium, the two black lines, D, visible in the spectrum formed from the ray, are much more prominent and sharply defined than they would be when the spirit flame was removed. This unexpected result having been arrived at, it was next attempted to produce the black lines, D, in a spectrum in which they were originally absent, and in this the professor was quite successful. A spectrum was formed by means of the Drummond light, which contains no lines whatever; in the course of the rays there was introduced an alcohol flame into which salt had been put; instantly there were evoked two dark lines of remarkable sharpness and fineness, which exactly agreed in position and appearance with the lines, D, of the solar spectrum. These lines have therefore been artificially formed in a spectrum in which, naturally, they were not present. A salt of lithium, which, as is well known, colours the alcohol flame crimson, gives to the spectrum of this flame one very luminous crimson line near the red end. If the solar spectrum be allowed to pass through a spirit flame which he coloured by a lithium salt, there will immediately be seen a dark line across it in a position about midway between Fraunhofer's B and C, whereas, if the flame be taken away the line completely disappears. Professor Kirchhoff concludes from these observations, that coloured flames are opaque to rays of the same colour as that which they appear, and he also makes the following curious speculation respecting the physical constitution of the sun. He supposes that those dark lines of the solar spectrum which are not evoked by the *earth's* atmosphere, exist in consequence of the presence in the *sun's* atmosphere of those bodies which, in the spectrum of a flame, produce luminous lines at the same place. He therefore assumes that the dark line, D, in the solar spectrum is caused by the presence of the element sodium in the incandescent atmosphere of the sun; and since it has been noticed by Brewster that an alcohol flame coloured by a potassium salt, gives a spectrum containing bright lines occupying the position of Fraunhofer's lines, A, *a*, B, the presence of potassium is probable in the solar atmosphere. The metal lithium, on the contrary, must be either entirely absent, or only present in very small quantity, since there is no dark line in the solar spectrum which coincides with the crimson band of the lithium flame.

The following modifications of the collodio-albumen process having been for some time past very successfully used, we think our readers may be benefited by a brief outline of the manipulations and formulæ in which it differs from the processes in most common use. Any good negative collodion may be used; it must be sensitised in a 40gr. silver bath, containing ½oz. of glacial acetic acid to every 16oz. of bath. The iodised albumen is made of the whites of 3 eggs, and 6 drops of acetic acid, stirred or shaken well together and filtered through sponge. When it has all run through, 8gr. of iodide of ammonium and 2drm. of treacle are to be added, and the whole must be filtered again until quite clear. The collodion plate is to be sensitised and washed slightly until greasiness disappears; it must be then drained and coated with the iodised albumen; afterwards drained again and dried spontaneously. Then sensitise in the same bath as before, wash slightly and drain; and pour over the surface a solution of pyrogallic acid, prepared by adding to 100gr. of distilled water, about 6 drops of a two per cent. alcoholic solution of pyrogallic acid. This solution is to be kept on for a few seconds and then poured off; the plate will only require to be drained and dried spontaneously to be ready for use. The exposure may take place any time within two months, and the development within two weeks after. To develop, use a saturated solution of gallic acid, to which is added a few drops of dilute solution of aceto-nitrate of silver. The development will generally be complete in about an hour, and the picture may then be fixed with hyposulphite of soda in the usual manner.

ON THE ANALYSIS OF THE SUBSTANCES EMPLOYED IN PHOTOGRAPHY,

WITH A VIEW TO THEIR IDENTIFICATION, AND TESTING THEIR PURITY.

In the photographic laboratory, it frequently happens that the labels on bottles, &c., become illegible, or fall off. And as most of the agents employed in photography are colourless, it is of the utmost importance that the operator be in possession of a ready means of identifying them. To accomplish this recognition of substances, similar in appearance, but dissimilar in properties, is the province of chemical analysis; but, for ordinary purposes, no very high degree of skill or experience is necessary; careful attention to a few simple manipulations will, in most cases, suffice, while the apparatus required is quite insignificant and inexpensive. A few watch-glasses, test-tubes, a slip of platinum four inches in length and half an inch in width; three or four glass rods; a dozen phials of the capacity of three to four ounces, for containing the solutions employed as *tests* or *re-agents*,* to show the impurities of substances; a spirit lamp; a small porcelain capsule three-fourths of an inch in diameter;

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* These re-agents are:—Nitric acid.
A solution of Nitrate of silver.
,, ,, ,, barytes.
,, ,, Ammonia.
,, ,, Ferrocyanide of potassium.
,, ,, Hydrochloric acid.
,, ,, Oxalate of ammonia.
,, ,, Chloride of calcium.
,, ,, Iodine in alcohol.
Red and blue litmus-paper.

an acetometer, and a hydrometer; these are all that are necessary, and may be obtained for a few shillings.

The experiments are made in the following manner:—

1. In the *watch-glasses*, we throw three or four drops of the liquid to be tested, stirring it with the glass rod, well washed, and wiped dry; then drop into the liquid three or four drops of the test or re-agent intended to show the impurities present.

2. If it be necessary to boil the liquids, as the watch-glasses are too thick and badly annealed, they will crack on the application of heat, it will be preferable to employ *test-tubes*.

3. If the liquid must be evaporated to dryness, we then employ the *porcelain capsule*.

4. The *slip of platinum* is employed for testing substances, which should volatilise without leaving a residue; it must, therefore, always be kept quite bright and clean, which is easily done by rubbing it with ashes and water.

Distilled water must always be used in analyses.

In these experiments, *method* is of paramount importance; if this be not strictly followed, much time will be wasted, and no certain result arrived at. The characteristic properties of photographic substances are described in our Dictionary of Photography, and they will serve to establish the identity of a substance; but, before establishing this identity, it is necessary to be able to ascertain its probable name. This can be very quickly arrived at by following the method indicated in the two following tables, *appropriated solely to the substances most in use in photography*, viz.:—

SOLID SUBSTANCES.

Citric acid; gallic acid; pyrogallic acid; bichloride of mercury, bromide of ammonium; bromide of cadmium; bromide of potassium; bromide of zinc; chloride of ammonium; chloride of sodium; cyanide of potassium; dextrine; fluoride of potassium; gelatine; gun-cotton; hyposulphite of soda; iodide of ammonium; iodide of cadmium; iodide of potassium; iodide of zinc; iodine; nitrate of silver; sugar of milk; sulphate of protoxide of iron.

LIQUID SUBSTANCES, OR SOLUTIONS.

Acetic acid; gallic acid; pyrogallic acid; acetonitrate of silver; alcohol; ammonia; bromine; chloride of ammonium; chloride of gold; chloride of sodium; collodion, plain; collodion, iodised; cyanide of potassium; ether; hyposulphite of soda; iodides of ammonium, cadmium, potassium, zinc; mixture of alcohol and ether; nitrate of silver.

Among the solid bodies, some are sufficiently indicated by a single characteristic, or by their aspect; *gelatine* is in transparent sheets; *isinglass* is fibrous or membraneous; *gun-cotton* is instantly recognised by its combustion upon the application of a spark; *iodine*, by its colour, and by the beautiful violet vapours which it gives out when heated; *sulphate of protoxide of iron*, by the green colour of its crystals. The others, which can often be recognised by their aspect, are more readily distinguished by the characteristics given in the annexed Tables.

The analysis of these substances would form a good exercise for the beginner in photography, as a means of initiating him into careful manipulation, and a knowledge of the laws of chemistry.

I.—ANALYSIS OF SOLID SUBSTANCES.

Put a piece of the unknown substance, as large as a grain of wheat, into a glass test-tube; *add one or two drops of nitric acid*: heat the tube gradually over the flame of a spirit lamp, *fumes arise*.	VIOLET. Condensing as a grey powder on the sides of the test-tube	Iodide	A fragment of the substance to be analysed is heated to redness on a slip of platinum	It is not volatilised			Iodide or bromide of potassium.
	RED.—*Condensing* in blood-red drops on the sides of the test-tube	Bromide		It volatilises. Then dissolve a fresh portion of the substance in a few drops of distilled water, and add a single drop of diluted solution of ammonia	No precipitate... ...		Iodide or bromide of ammonium.
					White precipitate. Put a slip of metallic zinc into the solution	*It remains intact*	Iodide or bromide of zinc.
						It throws down a grey metallic powder............	Iodide or bromide of cadmium.
	RED.—*Without coloured deposit* on the sides of the test-tube.....	*Odour of Chlorine* (aquæ regia). A portion heated upon a slip of platinum		*Volatilises* without leaving any residue...			Chloride of ammonium.
				Decripitates without *volatilising*...........			Chloride of sodium.
		Pungent odour of burning sulphur. Deposits a yellow powder (sulphur). The substance is in white crystals, which liquefy by heat alone. Its solution deprives iodine of its colour					Hyposulphite of soda.
		Nauseous odour. A specimen heated on a slip of platinum leaves a residue of carbon entirely combustible. It is an organic body................	The solution of the substance in distilled water colours sulphate of protoxide of iron an *intense blue*..............	The substance is *white*, and crystallises in *pearly scales*			Pyrogallic acid.
				It is generally *yellow*; crystallises in *fine needles*.			Gallic acid.
			The substance is white; gritty between the teeth; with a moderately *sweet taste*; gives out an odour of caramel when burnt				Sugar of milk.
			It has a *strongly acid* taste, and reddens litmus paper				Citric acid, or other solid organic acid.
	COLOURLESS. On adding some drops of distilled water, the substance is completely dissolved; on throwing in a drop of solution of iodide of potassium.......	*No precipitate*.	The substance diffuses an odour of bitter almonds (prussic acid), and *effervesces* in contact with an acid............				Cyanide of potassium.
			The test-tube, when washed and dried, becomes *roughened inside*, like ground glass				Fluoride of potassium, or other fluoride.
		It throws down a precipitate.. ...	*Red* precipitate............				Bichloride of mercury.
			Yellow precipitate				Nitrate of silver.

II.- ANALYSIS OF LIQUID SUBSTANCES AND SOLUTIONS.

Liquid bodies or solutions.	Odorous, on putting some drops on a slip of glass.	The substance volatilises without residue. The odour is sufficient to characterise it ...				Bromine, *red colour* Acetic acid. Ammonia. Alcohol. Ether. Mixture of alcohol and ether, for dissolving gun cotton.
		It leaves a *residue in pellicules. Collodion.*	On adding a drop of nitrate of silver...	No precipitate		Plain collodion.
				Yellow precipitate ...		Iodised collodion.
		Residue *crystalline.* Yellow precipitate, upon the addition of a drop of the Iodide bath. (The stoppers and corks of the bottles containing these solutions are generally blackened) ...	Odour of acetic acid.			Aceto-nitrate of silver.
			Slight odour of alcohol and ether.			Nitrate of silver bath, after being used.
		Residue *amorphous.* The solution gives out an odour of bitter almonds				Cyanide of potassium.
	Without odour, on adding *a drop of iodide of potassium*, in a little liquid..........	Precipitate is *red*......				Bichloride of mercury.
		Precipitate is *yellow*..				Nitrate of silver.
		White precipitate in the dark, which blackens in the daylight; neutral to litmus paper. (Chloride bath)...	Heated on a slip of platinum	Volatile without residue.		Chloride of ammonium.
				Volatile with residue.		Chloride of sodium.
		Yellow precipitate.	Light: a fragment of sulphate of iron produces none			Alkaline iodide bath.
			Deeper: a fragment of sulphate of iron gives a precipitate of *metallic gold*, in powder			Chloride of gold solution.
		No precipitate. Take another portion of the liquid, and add to it a drop of nitrate of silver	White precipitate, which blackens rapidly with excess of nitrate, even in the dark. This solution deprives iodine of its colour..			Hyposulphite of soda.
			Grey precipitate of metallic silver, after the lapse of some hours	Coloured blue by sulphate of iron.		Gallic acid. Pyrogallic acid.
				Coloured intensely blue by a drop of solution of gallic acid		Sulphate of protoxide of iron.

CONSTITUTION OF THE MOON.

The moon has generally been considered by scientific men as an entirely mineral sphere, without an atmosphere, water, or any living organisation. When viewed through a telescope, the air of desolation is striking. Its surface appears to be dotted with huge craters, and scarred with seams of lava. If it has no atmosphere, of course no living creature possessing a material frame like those on the earth can live upon it; but it has been recently asserted that a limited atmosphere has been discovered. M. de la Rive, and the Padre Secchi, with Professor Schwabe, have lately asserted that the moon has an atmosphere; and the latter states that it has also some vegetation on its surface. He says that the surface of the moon presents to the view numerous narrow streaks, similar in appearance to furrows, which, at times, appear laid over in straight, at other times in circular, lines. According to this theory, the streaks which extend from the summit of the Tycho, one of the most elevated of the mountains of the moon, have, at certain periods, a greenish tint, which they lose at the end of a few months: hence he infers that there exists in the moon vegetation, which shoots forth at a season corresponding with our spring, and dies at a period corresponding with our autumn, like most of the plants on our globe. But what now becomes of the assertion commonly accepted, that there exists no water on the surface of the moon? If the vegetation which Professor Schwabe has remarked on our satellite reflected a blue, red, or yellow ray, we could admit that its nature was different from that which exists on our earth; but as it is green, must we not conclude, by analogy, that it is the result of the same chemical combinations? Water would then become a necessity.

As a photograph of the Lord's Prayer, taken the size of a pin's head on a piece of paper, can be read distinctly with a microscope, it was supposed, with some degree of reason, that a large photograph of the moon would reveal very minute objects on its surface by the microscope. Quite a number of such pictures have been taken, but not a single grain of golden sand has been added to our treasury thereby. We have examined stereoscopic pictures of the moon, taken by a powerful telescope, and the luminary appeared like a huge ball of sandstone, there were neither signs of water nor of life upon it. In several pictures which were taken at different times, all of them exhibited a great depression near the upper side, as if there had been a vast basin scooped out of the solid rock, and worn smooth by water and abrasion. This appearance may have been caused by the instrument in which the pictures were taken; we merely mention the fact, in order to direct attention to it.

A Catechism of Chemistry.

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CHEMICAL AFFINITY—(*continued*).

Q. What is a chemical equation?

A. An equation is a concise method of expressing a decomposition occurring when two bodies which react upon one another are brought together.

Q. Give an illustration of such a decomposition.

A. When nitrate of silver and chloride of sodium are brought into contact with each other they are mutually decomposed, the chlorine in the chloride of sodium goes to the silver, forming chloride of silver, and the nitric acid goes to the sodium, forming nitrate of soda.

Q. How, then, is this expressed in symbols, so as to form a chemical equation?

A. In the following manner:—

$$AgO.NO_5+NaCl=AgCl+NaO.NO_5.$$

SPECIFIC GRAVITY.

Q. What is meant by the term specific gravity?

A. The specific gravity of a body means its weight in reference to an equal bulk of some other substance employed as a standard of reference.

Q. What standard is usually employed?

A. In this country, distilled water, at the temperature of 60° Fahr., is always used in determining the specific gravity of any substance.

Q. Is it of much consequence to determine the specific gravity of substances?

A. The specific gravity of a body is one of its most important and distinguishing physical characters. By its means the difference between the mineral iron pyrites and gold can be at once told, the latter being nearly four times as heavy as the former. In the same way, the difference in their specific gravities is frequently the only method applicable to distinguish between real and false stones in jewellery.

Q. How is the specific gravity of a body found?

A. The methods vary according to the physical condition of the body, whether they are solids, liquids, or gases.

Q. How is the specific gravity of a solid found?

A. The substance under examination is suspended from the scale pan of a balance by means of a fine horsehair, and then the weight is accurately taken. It is then immersed in a vessel of distilled water at 60°, and the weight again noted; the difference between these two weighings will give the weight of the bulk of water which the body has displaced, which will obviously be a bulk equal to its own. The loss of weight in water will, therefore, equal the weight of its own bulk of water.

Q. How may the specific gravity of a body be calculated from these data?

A. The rule is, divide the weight in air by the loss of weight in water, and the quotient will be the specific gravity.

Q. Give an illustration of this method of finding the specific gravity of a body.

A. A piece of metal weighed in air 820 grains; when suspended by a hair, and weighed in water, it only weighed 749 grains; it therefore lost $820 - 749 = 71$ grains, that being the weight of an equal bulk of water. Dividing the weight in air by the loss of weight in water, we get $820 \div 71 = 11{\cdot}54$, which will be the specific gravity of the piece of metal.

Q. What metal has the above specific gravity?

A. Lead; the lump experimented upon was a piece of that metal.

Q. How is the specific gravity of liquids found?

A. The specific gravity of a liquid is very easily taken. A thin glass flask is prepared, which will hold exactly 1,000 grains of water at 60° when filled up to a scratch on the neck. The bottle is first of all weighed empty, and then filled with the liquid under examination, and weighed again. The difference will represent the weight of a volume of the liquid, equal in bulk to 1,000 grains of water.

Q. How can the specific gravity of the liquid be told from that?

A. The weight of the liquid will represent its specific gravity.

Q. Give an illustration.

A. A bottle was taken which would hold exactly 1,000 grains of water at 60°. It was accurately counterpoised when empty, filled with oil of vitriol, and again weighed; the contents this time weighed 1,845 grains. The numbers 1·845 will therefore represent the specific gravity of the oil of vitriol.

Q. How are the specific gravities of gases taken?

A. In a somewhat similar way. In this case, atmospheric air is taken as the standard. A large flask is weighed when filled with air; the latter is then entirely exhausted from it by means of the air-pump, and it is weighed again. The flask is now filled with the gas under examination, and weighed a third time. From these data the specific gravity of the gas may be easily calculated. In practice, certain precautions must be taken to preserve accurately the same temperature throughout all the operations, and also to note the barometric pressure, since gases are liable to considerable changes in bulk from slight variations of external circumstances.

(*To be continued.*)

Dictionary of Photography.

◆

Oxides.—Oxygen has very extensive affinities, combining with every other known elementary body, except fluorine. The compounds thus formed vary greatly in their properties. Some are acid, others alkaline and neutral, and are, for convenience, arranged into these three principal classes or groups:—The first group contains all those oxides which, in their chemical relations, resemble soda, potassa, the oxides of silver and of lead; these are termed *alkaline*, or *basic oxides*, or *salifiable bases.*

The oxides of the second group possess properties directly opposed to those of the bodies just named. Nitric acid and phosphoric acid may be taken as types of this class; they are called *acids*, and tend strongly to unite with the *basic oxides.* When this union takes place a compound, called a salt, is generated, as nitrate of potassa or phosphate of silver, each of these substances being compounded of a pair of oxides, one of which is highly basic, and the other highly acid.

The third group of oxides—from the slight tendency to enter into combination—are called *neutral* oxides, of which the black oxide of manganese is a good example.

Certain bodies are capable of uniting with oxygen in several proportions, forming a series of oxides to which it is necessary to give distinguishing names—as protoxide, which contains one equivalent of oxygen; binoxide, or deutoxide, containing two equivalents; teroxide or tritoxide, containing three equivalents of oxygen; the sesqui-oxide, containing one-and-a-half equivalents of oxygen; and the peroxide, containing the maximum quantity of oxygen the base combines with.

Oxides of Silver.—Three combinations of silver with oxygen are at present known, namely, the suboxide, the protoxide, and the deutoxide or binoxide. The only one of these which presents any interest to the photographer is the protoxide. The suboxide consists of two atoms of silver with one atom of oxygen; the protoxide, of one atom of silver and one atom of oxygen; and the deutoxide, of one atom of silver with two atoms of oxygen.

The *protoxide* of silver—or simply *oxide*, as it is usually termed—is used in photography for correcting the acidity of the nitrate bath. It is usually prepared by adding excess of potassa to a solution of nitrate of silver; a light brown precipitate is formed, which is hydrate of protoxide of silver. This hydrate quickly parts with its water in a dry vacuum, or when gently heated, and is changed into anhydrous protoxide, in the form of an olive-coloured powder. The protoxide of silver readily parts with its oxygen upon the application of heat, and it is even decomposed in the cold under the influence of the sun's rays. The hydrated protoxide dissolves in a small quantity in water, which manifests an alkaline reaction upon certain coloured bodies; it does not combine with the caustic alkalies. The protoxide of silver is a powerful base, which combines with the most feeble acids, and completely neutralises the most powerful:

nitrate of silver, for instance, is perfectly neutral to coloured tests.

Deutoxide of silver is more stable than the protoxide, as it resists the temperature of boiling water; it only decomposes at about 300° F., and is then immediately transformed into metallic silver. In contact with the acids it disengages oxygen, and yields salts of the protoxide of silver.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 11*th June*, 1860.

At a recent sitting of the Paris Academy of Sciences, M. Faye read a paper on the present state of astronomical photography in France. He said:—The interesting notice published by Mr. Warren de la Rue, on the state of astronomical photography in England, has suggested to me the desire of reminding the Academy, that this new branch of science has not remained entirely stationary among ourselves since the first impulse given to it by M. Arago. But our labours differ from those of our neighbours across the Channel, inasmuch as they have been directed principally to obtaining, by means of photography, new methods of measuring; while the English have found in it unexpected resources for descriptive astronomy.

Thus, we have observed, photographically, the solar eclipse of the 15th of March, 1858, in the *ateliers* of M. Porro. On that same day I presented some magnificent proofs to the Academy of the principal phases of this eclipse, which had been obtained by M. Quinet, with an objective of long focus; the hour being registered by the electric telegraph of MM. Baudöin and Digney. Thus we gave, on the largest scale, the first example of a new and complete method of observing eclipses; and I have indicated the degree of exactitude, and the principal results which this method permitted us to obtain. Since then, this method has been partially applied by a French astronomer, M. Liais, in the expedition the Brazilian Government sent to Paraguay for the total eclipse of September, 1858.

Some proofs of the sun, when not eclipsed, which I subsequently presented to the notice of the Academy, helped admirably to determine the conditions of the spots on the sun, the elements of rotation, and the observation of the passage of the inferior planets. Even from a purely descriptive point of view, these proofs possess great value; for they show to the naked eye, without the aid of a magnifier, not only the faculæ of the marginal spots, but also the most delicate marblings which fringe the borders of the sun.

Many years ago, I proposed the substitution of the photographic plate for the human eye in meridional observations, and so suppress the observer, and, at the same time, the inevitable errors of our senses. My processes have come to be experimented with this year; at least, in part, through the zeal and skill of M. Porro; and I now present to the Academy one of the complete observations of the passage of the sun at the meridian, obtained within the past two months.

The apparatus, in which the constructor has deposited the germ of original and fruitful ideas, ought to be combined with an entirely new register, which MM. Baudoin and Digney wished to undertake for me; but, at the present day, the meridional observation of the sun can be made in less than a minute by a person entirely a stranger to astronomy, with a precision superior to that obtained by the senses of the most expert astronomer.

By means of a peculiar artifice, I have succeeded in applying this system of observation to the planets and fixed stars. This artifice consists in following the star with a movable plate during the time necessary to obtain a photographic impression, and to produce instantly on this plate, at a certain moment, the image from a point of the reticular by the aid of a flood of light; but the experiments have not yet been made.

I shall make use of these instruments in Spain concurrently with a considerable photographic apparatus, almost entirely executed and experimented with, for observing the eclipse of the 18th of July next; and also of a photographic register of the interior contacts of a total eclipse that MM. Robert and Porro undertook the construction of at my expense, and which I presented to the Academy in October last. Obliged to abandon the observation of that grand phenomenon, it only remains for me to thank publicly those skilful mechanicians, who have persisted in leaving all this apparatus at my disposal, with a generosity I cannot praise too much, doubtless with the persuasion that I would associate myself in some similar enterprise. But I must limit myself to expressing a wish that the fruits of so much energy and skill may not be entirely lost to science.

These very brief remarks will suffice, I hope, to justify to the Academy the assertion with which I commenced in saying that, if we have not in France made the progress—first realised in the United States, then in England—of photography applied principally to descriptive astronomy, *we have not fallen into the rear* in all that concerns the new methods which this new art, combined with electricity, offer to astronomy in measure and precision—methods which, sooner or later, will make as radical and complete a revolution in observatories as that which resulted from the discovery of lenses.

M. Belloc, a Parisian professor of photography, has just brought out a work called "*Code de l'Operateur Photographe.*" This little book is entirely extracted from the *Annuaire du Cosmos*, published this year by M. Tremblay. Those of our readers who possess the *Annuaire* will, therefore, have no need of purchasing M. Belloc's pamphlet; whilst those who do not possess the former, will find in the latter all the photographic matter contained in the *Annuaire;* that is, about a franc's worth of old and new formulæ for collodion.

M. Jomard, of the Academy of Sciences, wrote to the Viceroy of Egypt concerning the eclipse of the sun that will happen on the 18th of next month. The consequence has been, that the Viceroy has ordered a scientific mission to start for Ethiopia almost immediately, and to take every possible instrument of observation. Thanks, therefore, to M. Jomard's good idea, this eclipse will be observed at the two extremities of the line of total darkness, namely, at New California, and in Ethiopia.

We regret to find that M. Faye, who was to have left for Spain, with a host of photographic instruments for observing the eclipse of the 18th of July, will be obliged to remain in Paris.

M. Poey writes from Havanna to M. Elie de Beaumont upon an *aurora borealis* seen on the 24th and 25th of March, 1860, at Havanna, and which offered the remarkable circumstance of being visible only towards the east. It might, in fact, have been termed an *Eastern aurora;* and M. Poey thinks it would be exceedingly interesting to discover whether an aurora were visible, on that date, in any other part of the globe.

Mairan, in his large treatise on the *aurora borealis*, distinguishes eastern, western, and meridian *aurora*, which he denotes as "*irregular*," that is, *aurora* only partially developed.

M. de Luca, professor of chemistry at Paris, has just communicated to the *Moniteur Scientifique* an exceedingly interesting paper upon the mineral elements contained in one of those wonderful plants that vegetate suspended in the air, without any contact with the soil, and scarcely any adherence to the tree or shrub from which they hang. Such a plant is the *Tillandria dianthoïdea*. An examination of this vegetable showed that it contained 16 per cent. of water, and, after burning, left 10 per cent. of ash. In this ash was found a certain quantity of silica, a little lime, traces of magnesia, potash, soda, and phosphoric acid, a very appreciable quantity of iron, slight indications of manganese, sulphuric acid, and chlorine.

Thus we see that the mineral elements of this curious plant, which can only attract them from the dust, &c., carried before the wind, do not differ from those contained in vegetables which sprout from the soil.

La Science pour Tous of this week publishes a new process for obtaining the metal calcium, discovered by M. Lemaire. He first forms acetate of lime by dissolving some pure chalk in acetic acid. Into this solution, the author steeps a piece of white cloth, or linen, which is next plunged into a decoction of gall-nuts. When dry, the linen is thus covered with a crust of gallate, or tannate, of lime; it is then immersed in essence of turpentine, withdrawn, and lighted. Some globules of a very brilliant metal are soon perceived upon the burning rag; and, according to the author, they can be no other than calcium. They soon lose their brilliancy when the combustion is finished.

In one of his works, Bouchardat mentions that iron is reduced from benzoate of iron to the metallic state during the combustion of that salt, or rather to the state of steel, for it immediately combines with the carbon that is developed in the decomposition. This gave M. Lemaire the idea of experimenting as above with a salt of calcium.

I can hardly believe it is pure calcium that is produced in this experiment, as that metal is nearly as combustible as oil of turpentine, and would, no doubt, burn at the same time as the latter.

Proceedings of Societies.

London Photographic Society.

We this week continue our report of the proceedings at the above Society, held at King's College on the 5th instant. The chair was occupied by P. Le Neve Forster, Esq., M.A., one of the Vice-Presidents of the Society.

Mr. Dallmeyer read the following paper

ON THE NATURE OF DISTORTION, AS PRODUCED BY THE PRESENT FORMS OF VIEW LENSES, AND ON A LENS OR COMBINATION OF LENSES FREE FROM THIS DEFECT.

He said, the subject he was about to bring before the notice of the Society had already occupied, at various times, a considerable portion of the Journal of this Society, as also of other journals, which he thought fully indicated the importance of the subject. Such being the case, he trusted that they would bear with him, if some of the points he might state were already familiar to some of them. It would be his endeavour to bring before them the nature of distortion in the simplest and most familiar manner, avoiding, as much as possible, all formulæ and technicalities. It was quite obvious, from the numerous inquiries which were still being made, that many practical as well as amateur photographers were as yet uncertain as to what might be expected from the performance of any particular lens, or combination of lenses. He begged to premise, that his remarks on distortion of view lenses would be limited to the two principal forms now commonly employed, and producing images on a flat screen: first, the single achromatic or actinic meniscus, whether of the ordinary or any other form; and secondly, the more modern lens invented by Professor Petzval, and sold under the name of the Orthographic lens; and further, that these lenses, whether the one or the other, be furnished with a moderate-size diaphragm, or stop, affording what was called the necessary amount of "depth of focus." Strictly speaking, "depth of focus" meant a general want of focus, and this, to a certain extent, was unavoidable in all views where the various objects required to be taken were all situated at different distances from the lens, for only one of these could be in absolute focus. The only remedy in this case was a sufficiently small diaphragm, which should so far reduce the various pencils proceeding from the different objects that the circles of confusion necessarily produced by those out of focus should be so small as to be all but invisible to the unassisted eye. Those who were familiar with formulæ would readily find the necessary data for computing the amount in any of our elementary books on optics; but, perhaps, he might here be allowed to caution photographers not to resort to the use of very small diaphragms, if that could be avoided, for another very serious obstacle to definitions would present itself, due to the aberration from diffraction or inflection of light. Any one in possession of a tolerably good telescope might at once make himself practically acquainted with the existence of the aberration alluded to. If the telescope were pointed to a minute object, say, for instance, a star which appeared as a mere point, and the aperture were then contracted, say to one-half, the star would no longer be seen as an optical point, but as a disc of sensible dimension, and larger in the inverse proportion of the diameter of the aperture. Now, since every picture was made up of an infinite number of small points, if each of these were depicted as a disc, they must necessarily overlap each other, and the resulting picture would present a general want of definition. We were indebted to Professor Petzval for first drawing attention to this subject in connection with photography; and it had also been fully treated of by Sir John Herschel, in his excellent article on "Light," in the "Encyclopædia Metropolitana," which all who desired further information would do well to peruse. He believed that a pamphlet or paper on the same subject was also published some years ago, by the present Astronomer Royal, Mr. Airey, but which, as yet, he had not been able to obtain. First, then, on the nature of distortion as produced by the whole group of ordinary view lenses. Here, for the sake of clearness and simplicity, he would assume that the objects to be taken for a view were all situated in one plane, and at right angles to the general axis of the lens, and that they were made up of a number of straight lines—horizontal and vertical—forming, as it were, a number of squares; for what was true of these would be true of buildings which were principally made up of such lines. He then proceeded to examine the form or shape of such an object or figure as depicted by this class of lens on the screen of the camera.

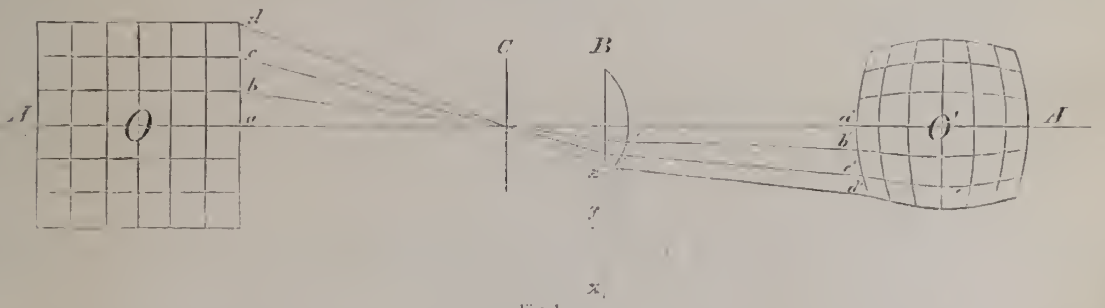

Fig. 1.

He begged to refer to fig. 1 upon the board, where A A was a right line, constituting the general axis of a view lens B; which latter, for the sake of simplicity, he had merely represented by a single plano-convex lens, which was quite sufficient for the purpose of illustration. Let C be a diaphragm placed at the usual distance before the lens (about one-fifth of its focal length), and let O be the square figure before referred to, in the place of a view. Now it was obvious that the diaphragm limited the several pencils as proceeding from the object, causing them to cross the axis A A at the place of the stop, before they were received and refracted by the lens; and thus different parts of the object were depicted by different parts or portions of the lens:—*i.e.*, the central portion of the object was reproduced by the corresponding central portion of the lens, and so on towards the margin. Now, since every lens might be conceived to consist of an infinite number of prisms, the refracting angles of which were formed by the tangents at the first and second surface, and which angles became rapidly greater in a convex lens as we approached the margin: if they now followed the course of a pencil of rays, or, as would be more convenient, the axis of such, a pencil as proceeding from the centre of this object O, they found that ray *a* suffered no displacement, and its direction was indicated by the general axis A A. If, in like manner, they pursued the course of ray *b*, and drew the tangent at the first and second surface of the lens, a prism was obtained, the refracting angle of which was represented by *x*, and which, according to its value, would cause ray *b* to be refracted and bent towards the general axis A A, and its direction was found as represented by line *b'*. The next ray, *c*, proceeding from the object, fell upon that portion of the lens the refracting angle of which was represented by *y*, which, being greater than X, would cause it to be more deflected and bent towards the general axis A A. Its direction was line *c'*. And, lastly, ray *d* falling upon the still greater refracting angle *z*, suffered greater displacement, and would be found to take the direction of *d'*. As before stated, he had merely followed the course of a single ray; but as he premised these rays were to represent the axis of the several pencils, and, therefore, having found their direction, and assuming the points of intersection to be situated in *a'*, *b'*, *c'*, and *d'*, they were enabled to construct figure O', which, as they perceived, no longer consisted of straight lines (excepting the two central ones at right angles to each other), but curved oval ones, and increasingly so towards the margin. They were all acquainted with the inward leaning of architectural objects when taken with this class of lens, as represented by the figure on the board, and he hoped that his familiar illustration had now sufficiently pointed out its cause. He now proceeded to the second form of view lens, viz., the orthographic. A somewhat similar diagram to the one already employed would answer his purpose. Fig. 2.

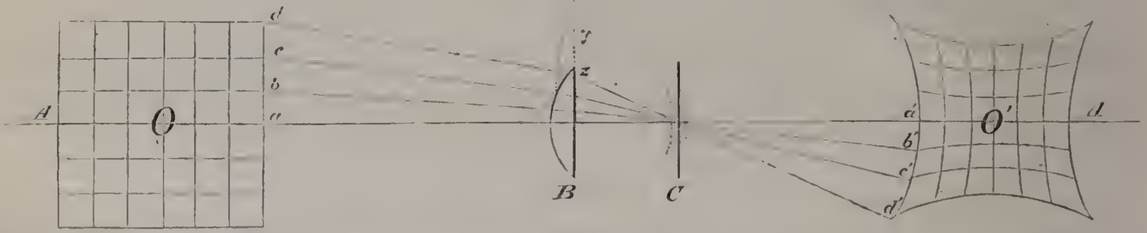

Fig. 2.

As before, let A A be the general axis of the single plano-convex view lens *B*. Let *C* be the diaphragm, which, in this case, was placed behind the lens; let *O* be the square figure in place of a view. Now in this case it was obvious that the rays, as proceeding from the various parts of the object, fall upon the lens, were refracted, and then limited by the diaphragm situated behind the lens. Thus the same condition obtained with reference to different parts of the object, being depicted by corresponding different parts of the lens. But in this case it would be observed that the rays crossed the general axis *after* refraction. If they now followed, as before, the direction of the several pencils, or their axes, as refracted by the several parts of the lens, they found that ray *a* suffered no displacement. Ray *b* fell upon that portion of the lens, the refracting angle of which was represented by *x*, and was accordingly in this case bent out of its course away from the general axis, according to the value of *x*. Ray *c* fell upon the greater refracting angle *y*, and was consequently bent still further from the axis; and ray *d*, falling upon the still stronger refracting angle *z*, suffered a correspondingly greater amount of displacement. If the figure was now constructed as before, again two straight lines were only obtained—the rest being curved; but in this case the curvature was exactly in the opposite direction to that produced by the other form of view lens. He had left out of consideration the negative combination, which, of course, formed part of the orthographic, since it had no effect with regard to the displacement of the several pencils, as occasioned by the first combination, except merely prolonging their foci. What he had stated of the single lens was, therefore, not modified by the negative combination, which should be in the position of the stop, and the latter should be of the same size as that in the previous case. It would be readily understood that the amount of distortion in both cases, as brought before them, would depend for the same size picture on the focal length of the lens, and the position of the diaphragm. Now, in the case of the orthographic lens, the diaphragm was somewhat nearer to the first combination, because the requisite amount of flatness of field was produced by the second or negative combination, and hence, upon the whole, the orthographic produced less distortion. In regard to the two forms of lenses referred to, he might state that some years ago the present Astronomer Royal gave both positions of single lenses for the camera obscura, in his valuable paper "On the Spherical Aberration of Eye-pieces" ("Cambridge Philosophical Transactions"), in which the subject of the forms of the various pencils was fully treated, and to which he (Mr. Dallmeyer) was greatly indebted. It was much to be regretted that the scientific world was as yet deprived of Professor Petzval's investigations, which led to the discovery of the orthographic form of lens. They were informed that he had the assistance of the Austrian Government to carry him through his protracted labours in this field. One or two pamphlets published by him had already been of great service, although they merely gave a general outline of his doings. He referred to the theorem contained in one of them—namely, "the reciprocal of the radius of the image, as produced by a combination of lenses, at the point of intersection, is independent of the form of the several lenses, and equals the sum of the products of the reciprocals of the foci into the reciprocals of the indices of the refraction." The Astronomer Royal, he believed, also found this to obtain in the case of the radius of the image as produced by the single lenses above referred to. They had lately been told that after the completion of his (Professor Petzval's) "Integrations of Linear Differential Equations," &c., now publishing, they should be favoured with the publication of the whole of his investigations, which promise, he hoped, would be fulfilled.

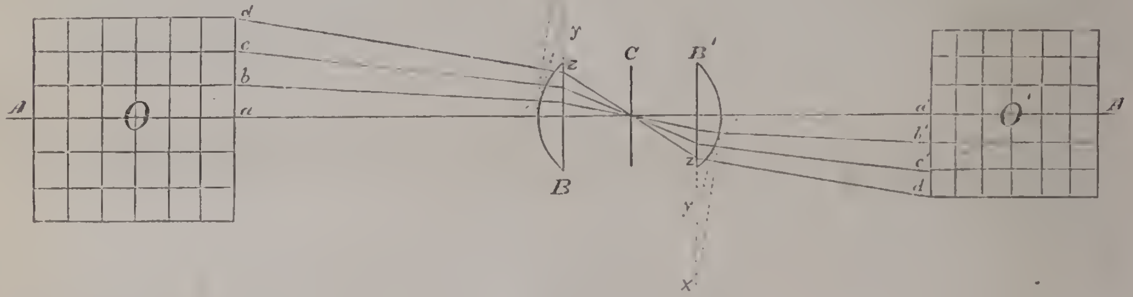

Fig. 3.

Mr. Dallmeyer then proceeded to the second part of his subject, viz., On a lens or combination of lenses free from distortion. Those who had attentively observed the nature of distortion, as produced by the two groups of view lenses brought forward, in which that of the one was exactly contrary to that of the other, might have conceived the idea, that if a combination of both forms of lenses could be effected in one instrument, distortion might be corrected; and this could be accomplished.

Fig. 3 illustrated this case. It would be seen that the refracting angles of the first lens were exactly opposed to those of the second; and if they followed the course of the several rays as refracted by them, they would find that they finally emerged parallel to the several incident rays, which was the condition required to be satisfied for the production of an image free from distortion. To Mr. Rothwell belonged the credit of first suggesting the remedy and to Mr. Sutton of bringing it before the public; the only difficulty being that, when two positive combinations, with their contact surfaces cemented, were thus combined, the curvature of the resulting image was too great to admit of being received on a flat screen. But being familiar with the theorem before alluded to, he suggested to his late father-in-law (Mr. Ross) that a negative lens placed in the position of the stop would have the desired effect of flattening the field. He did not, however, press the subject, because it appeared to him then, as it did now, that the expenditure of optical means for accomplishing such a purpose—at least, for the smaller size of plates—was somewhat extravagant. Mr. Sutton, who had previously given a familiar illustration of the manner of action of Professor Petzval's negative combination, afterwards also suggested the use of such an one to perfect Rothwell's combination, and pressed his late father-in-law to construct the instrument; but he regretted to say Mr. Ross's wonted energy had already begun to fail, which he (Mr. D.) first experienced when assisting him in the construction of the orthographic lens; and as Mr. Sutton only furnished the general outlines of such a combination, it was put aside, and there it remained. He might as well state that such a combination of lenses could be made to possess straight lines on a flat screen, and include a large angle; but if they were restricted to only six reflecting surfaces, he believed it would only answer for views. His late father-in-law often expressed himself, that a lens, free from distortion, if only obtainable for stereoscopic views, would be a great boon, and tend to the perfecting of the photographic art, and urged upon him the importance of constructing such an instrument; and ever since the subject had received his earnest attention. As already indicated, if they were not restricted in the expenditure of optical means, the desired end might be readily accomplished; but when the question of economics had to be considered also, it would readily appear that there were some difficulties to be surmounted. Moreover, his object being, if possible, not to introduce another new lens for this one special object, he was led to consider whether, among the forms of lenses already extant and used, something might not be effected to make them possess the great requisite. The lens most extensively used, and not likely to be superseded, was that employed for portraiture; and here he had introduced the principle before explained, and made it subservient alike for portraits and views, free from distortion, as would be seen from the pictures exhibited. The portrait lens, as constructed and left by his late father-in-law, was not intended for such a purpose, and therefore required to be reconstructed—one of the principal points being its great want of flatness of field, which in a portrait lens was not very important, since the position of a person when sitting might be so arranged as to approach the necessary curvature, and, indeed, the swinging-back camera afforded a remedy to some extent. But for the taking of views, flatness of field was one of the greatest requisites, and, to obtain it, great difficulties were encountered, as would be readily understood by those who comprehended Professor Petzval's theorem. He (Mr. D.) had approximated to a mean between astigmation and roundness of field. When employed for views without any additional lenses, and with the usual size diaphragm, it was free from distortion, had a flat field, and included an angle of upwards of fifty degrees; which was at least ten degrees more than was taken in by the forms of lenses above referred to. Since an increase of angle was virtually equivalent to a lens of shorter focal length, a proportionately larger aperture might be employed, still retaining the required amount of depth of focus. A great objection, therefore, as appertaining to the orthographic lens, in which the time of exposure was much greater than in the ordinary form of view lens, on account of its numerous reflecting surfaces, was set aside. Since, however, many landscapes were nearly free from buildings, the subject of straight lines or distortion, therefore, not being important, he had so constructed his portrait lens that, by unscrewing the back combination, and replacing it by the front, it was at once converted into an ordinary form of view lenses, and might be employed as such. In regard to stops or diaphragms, he had so arranged them that, counting from the largest to the next size smaller, the time of exposure to produce a picture was doubled, by which, he thought, much time lost in computing and experimenting would be saved. In conclusion, he begged to be permitted to observe that if it should be found that the instrument, which, in the hands of his late father-in-law, attained so great a measure of perfection, had been still further improved, and rendered more practically useful, especially as regards the production of an image free from distortion, he should be amply rewarded.—(Applause.)

In answer to questions put to him by members, Mr. Dallmeyer said, that in the latter part of the lens there were six surfaces, and that the equivalent focal length was 12 inches, with $\frac{3}{4}$-inch front, and $3\frac{1}{2}$-inch back lens, which was nearly the same as, but rather shorter than, the lens made the last four years; and, therefore, there was no material difference in time. He had not adopted the most elegant manner of proving his position, but had availed himself of familiar means of illustrating the angles of distortion. The form of front lens, as left by his late father-in-law, did not admit of being used as a single combination. The front combination of his (Mr. Dallmeyer's) instrument was so constructed that, by simply unscrewing it, and placing it in the position previously occupied by the back combination, it was at once converted into an ordinary view lens.

Mr. Shadbolt said he had one or two observations to make, but he was sorry to say that his memory for dates was very bad, and consequently he might not be very clear upon the points which he wished to bring forward. He confessed that he had been disappointed at not finding any novelty in what Mr. Dallmeyer had introduced, inasmuch as he had still in his possession a lens made by the late Mr. Archer, which combined nearly all, if not all, the principles included in the one which had just been described. He could vouch for the possession of this lens for upwards of seven years—it might be eight or nine; but he had resided in his present house seven years on the 3rd of last March, and he took the lens to that house with him. Upon this point he was perfectly clear. This lens was the ordinary portrait lens, with a single negative lens between the two, and he used it for landscape purposes, and he might say that a better one he had never yet seen of anybody's manufacture. As a double combination lens, it was constructed according to the ordinary form, followed after the formulæ laid down by Professor Petzval and the late Mr. Ross—that was, the front lens was a cemented compound and the back lens a separated compound; but in addition to that the diaphragms were placed between the lenses, at a distance corresponding to the respective foci of the combination of the lenses, that is to say, being somewhat under the front lens, which was a shorter focus than the back, and it was that, he conceived, which lengthened out the focus precisely in the manner described by Mr. Dallmeyer. That addition was made after the construction of the lens, not by Mr. Archer, but by himself (Mr. Shadholt) from hints given him by Mr. Archer. He could vouch for those hints having been given five years ago. Mr. Archer was then using it for landscape work—the lens being constructed precisely in the same manner as the one he (Mr. Shadbolt) was using now, and which he had used for a long time. Mr. Archer showed him one peculiar point in connection with its use, which was the advantage he found in taking interiors, where he was frequently limited for want of space, and wished to get a considerable angle. He (Mr. Shadbolt) thought that Mr. Dallmeyer had slightly slurred over the fact, that in order to get freedom from distortion, he must sacrifice a certain portion of flatness of field. He had not described the mode in which he had altered his ordinary portrait lens; but from what he had stated, there was a front and back combination of identical focus, with a concave between—in point of fact, he had taken up what Mr. Sutton had alleged to be his symmetrical triplet. At the time that triplet was brought forward, he (Mr. Shadbolt) pointed out the facts to which he was now alluding, and consequently alleged that there was not that novelty which was supposed to exist in the lens. He was not aware that Mr. Archer ever offered his lens to the public; but that he made and sold several he did know, both from Mr. Archer himself and his late wife, and he had also seen several in his possession; but as he (Mr. Shadbolt) was not aware that Mr. Archer did make his lens known to the public, probably neither Mr. Dallmeyer nor Mr. Sutton had heard of it. But certainly, at the time that Herr Paul Pretsch introduced Petzval's orthographic lens, he (Mr. Shadbolt) published a statement to that effect, he believed about two years ago—certainly eighteen months ago. He pointed out then, and subsequently, when the so-called committee of the Scotch Society issued a very ludicrous report upon lenses, that they had discovered something extraordinary—that the position of the diaphragm in front produced a barrel-shaped image, and the diaphragm behind produced an hour-glass-shaped image. That was no novelty to him, and he was persuaded that it was not a novelty to many others; yet still that fact was pointed out both at the time Herr Paul Pretsch brought forward Petzval's modification, and also at the time when the Scotch Society issued their report on distortion.

He had frequently remarked in portrait lenses that when any advance was really got in one direction they had to sacrifice in another. Now, if Mr. Dallmeyer could show that the alteration he had made in his portrait lens—whatever that alteration might be—did not sacrifice anything either in definition or curvature of field, then it must be regarded as an advance in the construction of the instrument; but, unless he showed that fact, they were simply where they were—in fact, it was merely substituting one defect for another. He (Mr. Shadbolt) had made these remarks for no other object than simply to draw as much out of Mr. Dallmeyer for public information as could possibly be obtained.

Mr. Malone said, he would not be deterred by the reproach, that some members endeavoured to speak upon every subject. He considered it their privilege—more than their privilege, it was their duty—of course, endeavouring to speak to the point. He would begin at once by confessing his great ignorance of theoretical optics. He would not pretend to enter into any philosophical discussion of the subject; and he regretted that there were not present more gentlemen of Mr. Shadbolt's degree of attainments. He would mention that he always thought that the late Mr. Ross should have been attached to the Society in a permanent manner: but his suggestion was overruled, as it was thought that, Mr. Ross being so connected with trade, such a step would cause jealousy; and it was considered not well to place him upon the Council. He regretted that course to this day, and it was with this sort of feeling that he welcomed Mr. Dallmeyer's presence there that evening; and the Society must give him all credit for the present illustration of his subject. Having made these introductory remarks, he proceeded to say that it was very clear, as Mr. Dallmeyer had observed, notwithstanding Mr. Shadbolt could find no novelty in the matter, that photographers generally had not that intimate knowledge of the subject to enable them to judge sufficiently what to expect from a lens, and it was only by trying it that they got any idea about it, other than that which they got from the makers and sellers of lenses, and that which was occasionally written upon the subject. They were often much perplexed. They were aware that it was the business of an instrument maker to bring the best points forward with regard to his invention. That was but fair; and, in trying to disparage a lens, they must take care that it be done with judgment. Without taking upon himself to be a general censor, he would just point out how it appeared to him that members occasionally erred. The late Mr. Ross had a strong opinion, speaking generally, that those writers and gentlemen who took part in optical discussions had what was called school-knowledge, which might be sufficient to enable them to take some part in the discussions, and to understand the nature of improvements suggested, but which hardly justified them in giving to an optician in full detail the plan of procedure by which he should make a good lens. Now, this was the case. A suggestion was made by a person only partially competent, and then he required such practical men as Mr. Ross or Mr. Dallmeyer to work it out for him, which, of course, they did not want to do, as it involved a great amount of labour. Photographers had a right to speak in a general way on these subjects; but they were not commonly possessed of that amount of knowledge, theoretical and practical, which entitled them to dogmatise. In addressing himself to the subject, as a photographer handling many lenses, his impression was, that members ought to hail and welcome cordially any attempt to produce a lens that would give straighter lines. If they could have this accomplished with flatness of field and definition, so much the better; but when they had an invention offered to them, let them look well, calmly, and dispassionately to all the circumstances, whatever they might be, even should they fail in the promised results, to see whether there were any advantages of which they could avail themselves. He hailed with satisfaction the introduction of the orthographic lens, and had expected to get better results than he did, for they had been told that it gave straight lines. Now, there was a fallacy involved in that promise. For instance, if a picture of a gateway were examined, the lines of the gateway would appear to be straight, because they did not fill the whole of the picture; but the lines were not straight, if continued to the top of the picture. It was only a kind of artifice; but this kind of artifice was sometimes of use to them. There was no doubt that the orthographic or orthoscopic lens would be a better lens than the old form of view lens; but it was seen at once that there were many things to discriminate. They found that in taking a view of a street, with the corner of another street running into the picture, that corner would be represented by a curved line; if the corner of the street ran up the whole picture, they would, by the orthographic lens, have the buildings appear to be about to tumble into the street at the top, or tumbling out at the bottom, which would not be natural; and then they would probably prefer the old form of view lens. Photographers could not get rid of the necessity for the old form of view lens, and it appeared to him, that on starting out, they must take the old form of view lens, whether single or double, and get the barrel-shaped picture, or the orthographic, which gave the pincushion shape; and, if all that had been said at the meeting was true, they would have to add this third lens. Mr. Dallmeyer had said that his portrait lens, in which he had lessened the distortion, might be taken in half, and one half be used as a view lens. The reason given for that did not satisfy him (Mr. Malone). Mr. Dallmeyer had observed, that in dealing with buildings with a view lens, they got the barrel-shape; and then he said, if they took a landscape, which was generally free from buildings, this was of less consequence. He (Mr. Malone), however, did not admit that—truth was of the first consequence—and he would give an instance where it would at once be detected. If this single combination were taken to avoid any loss by reflection, in consequence of the number of reflecting surfaces in the whole combination, and a picture were taken containing trees, which in nature were absolutely straight, the trees would be produced bent. They must not, then, go back to the old view lens, or they would have the trees barreled. He knew it would be said, who knew that they were barreled? but he wanted photographers to guard against that, deceiving others, and perhaps themselves. Let them look at the three diagrams before them, and say which they would prefer. He thought that a little definition might be sacrificed if they could get straight lines. The result, in his opinion, was, that photographers would find all the lenses useful, and perhaps a fourth; for he was bold enough to think that they ought to have a large double portrait combination for certain purposes, to meet every possible case, and to do the best under every possible circumstances; for every photographer knew the variety of circumstances under which he was sometimes placed, when out on an excursion.

Mr. Bedford said, that certainly the objections Mr. Malone made to the peculiarity of these lenses prevailed to a great degree. He (Mr. Bedford) had a sea line curved up and down, and he had also had larch and fir trees bent in a singular manner; and he quite agreed in the opinion that it was necessary, in order to be prepared for all kinds of work, to take all the lenses that were made. He took a portrait lens of Ross—the one known as the £25 lens—which he found very useful for dark objects in glens and interiors, and such subjects as those; the orthographic, for flat architectural views, and the old Ross view lens, than which there was nothing better for landscapes, as it gave greater depth of view and better average perfection than any other lens. He was quite certain that the orthographic was not an improvement for landscapes, although very useful and almost indispensable in certain exceptional cases. He should like to have seen specimens of the production of these lenses upon large plates. In those exhibited the lines seemed straight, but there was a very sensible falling off in the sharpness of the pictures, and particularly that of the *Times*, for, small as it was, the lines were not only out of focus but blurred. He did not know whether the lens had been worked under all its advantages.

Mr. Dallmeyer remarked, in reply to Mr. Bedford, that with reference to the copying of the *Times*, he ought to have stated that the aperture of the lens employed was one inch and a-half, or more, and therefore it was not presented as a test of a copying lens. If used as such, it would have been employed with an aperture of about one-third of the above. This gave perfect definition all over the field, and therefore Mr. Bedford's remarks did not apply.

Mr. Hardwich had lately been attempting to copy maps and pictures of the full size, and was inquiring as to the lens most likely to answer for that purpose. The symmetrical triplet, or any other lens which promised freedom from distortion, would be a great improvement. He was very much impressed with the idea that the aperture of the lens ought not to be too much cut down; for by doing so the intensity of the negative was greatly lessened, and the lines of the picture were fogged over in the development. He would ask whether it would be possible to construct a triplet lens, which would cover two feet square, free of all distortion, and would work in a reasonable time. By means of strings stretched tightly across the board carrying the picture, he had that day been measuring the distortion given by a lens of the new construction, called orthographic or orthoscopic, and although as yet he had not concluded his experiments, he was surprised to find how very small the distortion appeared. The plates were 22 inches square, and the lens had a solar focus of 4 feet 1 inch. The late Mr. Howlett used to say, that when he copied maps piecemeal by the orthographic lens, the pieces would afterwards fit together accurately, but since then others had stated differently. The discussion of the evening was upon optics, and he did not wish to lead the members away from that subject, but he might mention that he had been trying some experiments with a view of getting rid of the bichloride of mercury, which was used at present in intensifying the weak negatives produced in copying. He showed about a year ago that a very little bichloride of mercury in a bath would throw it out of order, and he had lately been reading that this bichloride was apt to stick to the glass plates, and could not easily be got off. He hoped that any members present who had had experience in working large lenses would enlighten the meeting.

Mr. Malone thought it would not be out of place if he were again to speak of an experiment which was pertinent to Mr. Hardwich's inquiry. He made the experiment in conjunction with Mr. Ronalds, the director of the Kew Observatory, when assisting him in carrying out the photographic registration there. Mr. Ronalds was extremely anxious to know whether he could rely upon photographic results as to measurements made from them. Mr. Ronalds, who was well skilled with regard to geometrical matters, drew a square foot on paper in square inches with the greatest possible accuracy. Mr. Ronalds inquired if he could copy that of the exact size with the spaces true. Many experiments were made, and at last he succeeded in making a copy in which he believed he retained the exact size of the diagram, which was a foot square, divided into inches, black and white, of course. Mr. Ronalds was surprised at his (Mr. Malone) getting so exact a *fac simile*, but he was too cautious to make use of that term. However, it satisfied Mr. Ronalds' scrupulosity as regarded the practical point. The experiment was made in conjunction with Mr. Henneman. The lens was made by Mr. Slater, and was employed to take large portraits; it was with some four or five inches aperture, and could be used either as two lenses together or as one; but there was a third lens put in to shorten the focus. The third lens was of greenish glass, and was very slow for portraits, but used in this way with a stop, which he believed was of an inch, he obtained the above result; and his impression was, that he could not have done it at that time with any other form of lens. The late Mr. Ross impressed upon him (Mr. Malone) the necessity, when asking what sized plate a particular lens would cover, of explaining the object in view—that if about to copy a map, with the lines to meet exactly, they must go to the expense of a large lens with a long focus, and the result would be that they would get a portion out of the centre of that curve which comes nearer to a straight line; but that, of course, involved expense. Therefore, seeing how near he could already effect his object, he had great hopes of Mr. Dallmeyer's new lens.

Mr. Dallmeyer said, he would not detain the meeting long; in fact, one gentleman had almost spoken in reply to another with reference to distortion and amount of distortion. He would now explain the reason that had induced him to bring this paper before the Society. It was owing to the fact of his being asked continually what lens was free from distortion, and also to the circumstance, as he had stated in his paper, that he conceived the subject of distortion was not well understood by many photographers. It was for those that he had written the paper, and abstained from giving formulæ, for what he could give might be found in the works on optics, to which he had alluded; for gentlemen seeing formulæ in a paper often made the remark that, not being mathematicians, the subject did not interest them. He had, consequently, simply exhibited the diagrams. With reference to novelty, he claimed none. The lens was free from distortion as far as that was obtainable; for he might state that a lens producing pictures on a flat screen absolutely free from distortion was well nigh an impossibility. The nearest approach possible required a lens to be as large as the picture produced, which was far too expensive a matter to consider: hence it was necessary to ascertain how far we could approach to the production of an image practically free from distortion with means that were not extravagant; and it was by the focal length and forms of the combination of lenses, as described in his paper, that the distortion, due to the alteration in the direction of the pencils, could be got rid of—the distortion remaining being only that which was produced from the difference of the foci of the central and marginal pencils; for this lateral pencil ought to come to a focus nearer to the lens than this central one, and therefore a certain small amount of distortion due to this still remained. It was desirable to arrive at an approximation as nearly as they could. He believed that the difference between the length of the central and marginal pencil, and the distortion occasioned thereby, was quite insignificant, as compared to that shown in figs. 1 and 2. His lens, when employed for views, did not consist of two positives and a negative, but of two positive combinations only; the number of reflecting surfaces, therefore, was six and not eight, as in Mr. Shadbolt's combination, and as such it had been used. He had already stated that the number of refracting surfaces in lenses, where of necessity a small aperture was employed, was a great objection, because the loss of light, if that number were great, would be extensive; and hence persons had found that with the orthoscopic lens the time of exposure, as compared with the ordinary view lens, was greater, perhaps double. With regard to lenses for copying, it was readily understood from what he had already stated, that the amount of distortion depended on the focal length of the lens—the longer the focal length, the less the amount of distortion. He would beg to say, that perhaps what might be thought to be a chemical difficulty might also be an optical one, due to the aberration from diffraction, for if the amount of confusion produced by this aberration were taken into account for a long focal length of lens with a small aperture, it might be that it was that aberration which caused the confusion spoken of by Mr. Hardwich. He just threw that out as a hint, perhaps, to be inquired into, so as not to be misled in the *rationale* which he might form of the subject. With regard to a number of lenses being requisite at different times, that was one of the reasons why he had made his portrait lens subservient to different purposes. Not that he wished to say, use the front lens alone; but the focal length of the front combination being different to the focal length of the two when combined, there might be at times a desire to produce pictures of different sizes; hence, he had suggested in his paper the use of the front combination as a single view lens. With regard to the observations of Mr. Shadbolt, and his inquiry, as to whether other important qualities were sacrificed in the obtaining of those sought after—namely, freedom from distortion, and flatness of field, he had brought with him the pictures exhibited, by which he thought he had afforded the means of judging as to the merits of his instrument in all respects. He had given its equivalent focal length, which expressed its rapidity, knowing its diameter was 3¼ and 3½ inches respectively. Therefore, as before stated, he believed he had not in any manner sacrificed anything to the obtaining of the qualities sought after. With regard to copying, and with regard to the taking of the views, the time of exposure was an indication of the size of the aperture. Mr. Dallmeyer concluded by saying that he would be happy to answer any further questions. (Applause.)

The Chairman, in a few remarks, proposed that the thanks of the meeting be given to Mr. Dallmeyer, which was cordially responded to.

In the course of the evening, Mr. Dallmeyer was heard to remark that his object-glass, lately completed, of 8 inches aperture and 129 inches focal length, was practically without any depth of focus; the aberrations being so perfectly corrected, that the rays, so to speak, crossed at one physical point, which he considered to be the great excellence of the instrument.

The meeting, which, as our readers are aware, was the last of the season, then terminated.

Photographic Notes and Queries.

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THE NORTH LONDON PHOTOGRAPHIC SOCIETY.

Sir,—As your report of the observations I made at the last meeting of the North London Photographic Association, on glass for pressure-frames, may convey a wrong impression, I shall feel obliged if you will insert the following correction.

At a previous meeting, Mr. Goslett gave me a piece of blue glass, 5-16ths of an inch in thickness, to compare with others, stating that he considered it would facilitate printing. On comparing it with a piece of green (Birmingham patent plate), ½ inch thick, I found that the blue glass, notwithstanding the difference in thickness, was much *slower*.

The other remark I made was, that the green glass had been *used* for *years*, and had not changed colour. The only objection to white glass was its softness, liability to scratch, and to become yellow.—I remain, Sir, yours, &c., D. W. Hill.

GOLD-TONING BATH.

Sir,—In the "News" for May 11, you give, under the head of "Foreign Science," an account of the Abbé Laborde's new toning bath, of which the ingredients are thus given in page 20:

Chloride of gold	1 gramme.
Acetate of soda	30 grammes.
Water	1 litre.

But, in page 14 of the same number, you give, in "English Weights and Measures," what was intended to be, I presume, the *same formula*, in a form more simply expressed:—

Water	12 ounces.
Acetate of soda	4½ drachms.
Chloride of gold	5 grains.

For 4½ drachms of acetate of soda, read 2⅓ drachms, and you have an approximation to the French formula sufficiently correct for all practical purposes. The exact weight is 154 grains.

I have tried this formula, and think it one of the very best of the many that have been proposed. W. L.

Query.—Whether *citrate* of soda would not be preferable—for its *colourable* properties (in certain combinations) upon nitrate of silver—to the acetate?

ALBUMENISING POSITIVE PAPER.—FORMULA FOR POSITIVE COLLODION.

Sir,—Doubtless you can advise me as to the best albumeniser of Canson's positive paper. I have been terribly put about lately, not being able to rely on two sheets from the same sample being alike. This is particularly noticeable in toning.

Has "H. R. R." removed the pine envelope to his bath? and, if so, with what results? Also, has "F. W. F." tried my collodion? and how does he succeed with it?

I am experimenting on the various developers, and hope at some future time to give you a few notes on the same.

In reply to "Inquisitive's" letter in the "Photographic News" of June 8, I am happy to supply that gentleman and your readers, *en masse*, with an equally good formula for positive collodion, the difference being, using 20 grs. of gum-paper in lieu of the larger quantity, and bromo-iodising with bromide of ammonium, 10 grs.; iodide ditto, 20 grs. This preparation will be found (of course with a normal bath) extremely sensitive.

Oxoniensis.

LINSEED TEA PROCESS.

Sir,—I should be very greatly obliged if you would tell me, through the medium of your instructive journal, what the linseed tea process is—what the manipulation? Also, what is meant when you are directed as follows: "Clean the plate, and then bake in an oven?" The baking bothers. U. K. Walker.

The French Musical Festival.—The great French musical festival of the Orpheonistes, at the Crystal Palace, commences on Monday, June 25, the artists being expected to arrive on the previous day. A very fine selection of music will be performed, including the "Septuor" from the "Huguenots," which produced a great sensation at the Palais d'Industrie last year when rendered, as it will be at the Crystal Palace, by thousands of voices, accompanied by military music. Two choruses have been written for the occasion by M. J. F. Vaudin, and set to music by the celebrated French composers, MM. Halévy and Ambroise Thomas, entitled "France! France!" and "La Nouvelle Alliance." This international festival will doubtless attract numerous visitors, and we hope that photographers will be on the alert to secure permanent memorials of so interesting an event.

MEETINGS OF PHOTOGRAPHIC SOCIETIES.

Monday, June 18—Blackheath Photographic Society.
Thursday, ,, 21—South London Photographic Anniversary.

TO CORRESPONDENTS.

Justitia, in a letter addressed to us, complains that he has been victimised in making a journey of some three hundred miles to take a situation as "first-class operator," from which, at the expiration of two weeks, he was discharged with one week's notice, upon some frivolous plea. He thinks that operators should use extreme caution in forming engagements, as cases sometimes occur in which a photographer is engaged merely *to teach* the employer. If "Justitia" has a written agreement, the County Court will afford him satisfaction for the loss and injury he has sustained.

B. R. (Dorset).—1. If you varnish the cloth, it will become stiff and unwieldy. Better line it with yellow calico. 2. Grey—obtained by mixing ivory black with whiting and size is the best; the exact tone will depend upon the room wherein it is placed. You can modify it to suit. A lead colour is about the hue. Some cover the background with brown paper—that is a good neutral colour. 3. Chloride of sodium, common salt, will answer, and is, we suppose, what is meant.

E. W. H.—1. Try another developer. We do not suppose that the film is broken up, unless the collodion is very old and decomposed. 2. There is nothing new required in preparing paper for large portraits, only to extend the scale of operations. 3. Evaporate the bath, as you describe. Filter, before using it. 4. Carry the toning to a greater depth. The prints always lose colour in the hypo. bath.

In Terrorem.—The fear of being poisoned need not deter you from the practice of photography. The only two poisonous substances employed are bichloride of mercury (corrosive sublimate) and cyanide of potassium, both of which you can do very well without.

A. C.—As you are afraid to use cyanide of potassium, touch the stains with tincture of iodine, and let them dry; then apply solution of iodide of potassium, and repeat the applications until the stains of silver are removed.

Ossian.—As you are not a chemist, you should exercise extreme caution in "doctoring" your collodion or nitrate bath. A maxim well worth your notice is, "let well alone."

Oxymel.—Turn your attention to some other application of photography; one more profitable than that you are engaged in may surely be found without difficulty.

A Tyro.—If you cannot convert decimal into vulgar fractions your education must have been much neglected. The ½ of 100 is ·50; consequently, ·75 is ¾ of 100.

Aurum.—Doubtless your gold bath is acid; add solution of carbonate of soda till litmus paper is no longer reddened. If you make a fresh toning bath, let it stand twenty-four hours before using it.

Anstea.—Your sensitising bath is doubtless in an alkaline condition. Test it, and if that proves to be the case, add a drachm of water containing a drop of nitric acid, little by little, till acidity is manifest.

G. H. F.—It is no improvement to add acid to your sensitising solution for paper positives; some photographers think they must add acetic acid to everything.

Kirk.—You say "dry process," but evidently mean a preserved process. Of these latter you have a choice; one is as good as another—success depending chiefly upon the amount of skill and patience you bestow upon it.

E. H.—The matter has been fully explained in previous numbers of the "Photographic News." Consult the indexes of the previous volumes.

Stereo.—A twin-lens camera is preferable; and, with dry plates, you can make the tour you propose without a heavy encumbrance.

P. Q.—There is no substitute for hyposulphite of soda for fixing positives on paper that will answer as well.

Optics.—The price of the lens described is sixteen guineas, and it answers equally well for portrait, architecture, and landscape.

Albert.—The addition of a grain of bromide of cadmium to each ounce of collodion would doubtless answer your purpose.

W. Watson.—The difference in colour is due to a difference in the sizing material in the paper.

B. F. (Sheffield).—Use the protonitrate of iron developer, as described in the "Photographic News," Nos. 91 and 92.

J. Jefferson.—Your suggestion will be taken into consideration. The only objection we see is, that the letters would occupy too much space.

Carbon.—There is no difficulty in obtaining nitrate of uranium at the operative chemists'.

W. S. W.—You throw the blame on your chemicals; but the cause of your difficulty lies in careless manipulation.

Orton, F.—If, as you say, you have all the back numbers of the "News," consult the indexes, and you will find all you require.

Oxford.—You can restore old collodion only partially to its original sensitiveness, by placing a piece of cadmium foil in it. If too thick, add ether.

T. R.—Your communication possesses much interest and some novelty, but in its present shape it is not fit for publication.

W. W.—The subject was treated fully in the last volume of the "Photographic News."

C. A.—"Fownes's Chemistry" is as good as any for a beginner, but there is no such thing as Science for beginners.

Charles.—If the sky is tolerably fair, do not stop it out; negatives so treated produce very inartistic positives.

S. R. B.—You cannot ascertain the strength of your nitrate bath by its specific gravity; it requires the aid of analysis.

H. A.—Methylated spirits of wine is cheaper than pure spirit, and will answer your purpose as a solvent of lac.

Ford, J.—A long-focus lens will be necessary to obtain a *fac-simile* of a large map.

Hants.—You can doubtless exhibit your productions at the Crystal Palace.

O. A.—Your query is answered in the article on Colour in the present number.

John Brown.—We suspect the article you describe is "made to sell."

Y. Y.—You will find a description in our "Dictionary of Photography."

G. Z.—We prefer lac-varnish in every case where it is applicable.

⁂ All editorial communications should be addressed to Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard, London, E.C.

THE PHOTOGRAPHIC NEWS.

Vol. IV., No. 94.—*June* 22, 1860.

ON THE POSITION OCCUPIED BY PHOTOGRAPHY AMONG THE FINE ARTS.

By *Fine Arts*, in the general acceptation of that term, is understood the Representative Arts, the arts by which we represent objects and persons.

This representation is accomplished by two distinct modes of operation, to which we give the names of *Graphics* and *Plastics*.

By graphics, or the art of design, we represent objects on a *flat* surface, no *relief* being attempted; the effect is obtained by means of outline, light and shade, colour, chiar-oscuro, and aerial and linear perspective.

The plastic art represents objects in partial or full relief; it generally dispenses with colour, trusting to form and to its integral chiar-oscuro to produce the desired effect.

The plastic art is sometimes called the formative art. The special office of sculpture consists in the ideal perfection of organic form, and its highest aim is beauty in repose. The human form is the best vehicle of the sculptor's thought.

Sculpture is justly entitled to the high rank it holds in the estimation of civilised mankind, but it can and must carry expression to its highest point of perfection, from the fact that it leaves us only what is essential. It always strives to represent a single point of time, choosing the highest moment of expression. In selecting a pathetic subject, for instance, it seizes upon one that awakens terror, pity, or horror, as in the Laocoon, the Dying Gladiator, &c.

By a general classification of the fine arts, we are enabled to comprehend at one view the peculiar province of each, the relation each one bears to the others and to the whole.

In the first division we place graphics, or design. In this general term are included all the methods and means by which objects are represented on a flat surface:—

1st. The different methods of painting; the productions of the artist.

2nd. The means by which his productions are mechanically copied, imitated, and multiplied—the reproductive arts.

The methods of painting are dependent on the vehicle or medium with which the pigments are mixed, and on the kind of surface to which they are applied. Thus, a water medium, mixed or unmixed with some glutinous vehicle, gives rise to *fresco-painting*, when the pigments are mixed with fresh plaster or mortar; to *tempera painting*, when applied to canvas, or hard plaster; to *water-colour painting*, properly so called when applied to paper; when the pigments are applied to ivory tablets, they are usually called *miniatures*.

Painting with a wax medium is *encaustic painting*, and is generally executed on panels. Statues were coloured by the ancients with pigments incorporated with a wax medium.

Mosaic belongs strictly to the graphic art, inasmuch as it represents the artist's design by a combination of flat surfaces, and in such perfection, that the pictures of Raffaelle, Michael Angelo, and other masters, are reproduced in *fac-simile*, with all their delicate gradations of light, shade, colour, and chiar-oscuro. Tapestry is mosaic in wool.

Pigments are mixed with varnish for painting on glass and porcelain, constituting *enamel painting*, in which the coloured materials are burnt-in, or vitrified.

Oil painting, as the term implies, consists in painting with pigments ground in oil; it is applied indifferently to wood, metals, hard dry walls, &c.

The mechanical processes by which pictorial works are copied, are, printing in colours from wood and from stone; chromo-lithography; by the loom, as in Gobelins tapestry; by the needle, as in embroidery. These reproduce the colours as well as the design. Engraving copies only the form and chiar-oscuro, and in this respect photography is closely allied to engraving, inasmuch as it does not reproduce the colours of a picture, but only the forms.

The works of the engraver, who justly ranks as an original artist, or *translator* of the painter's thought, are capable of being reproduced in *fac-simile* by mechanical processes, such as lithography, and the anastatic process, which operate by means of a *transfer* of the engraving. The engraved plate is also multiplied by means of the electrotype process. Engravings may be copied in *fac-simile*, or on an enlarged or reduced scale, by photography.

There are two systems of painting: first, painting in *flat tints*, in which the colours are neither shaded nor blended, nor modified in hue from the contiguity of other coloured objects; it is totally deficient in chiar-oscuro.

The other system is painting in *chiar-oscuro*, in which the painter represents as accurately as possible an object in relief, in such manner that the image makes an impression on the eye similar to that produced by the object itself.

In painting on the system of *flat tints*, the representation of the object is reduced to the observance of linear perspective, to the employment of vivid colours in the foreground, and of pale and grey tones in the distance. The essential qualities of this system of painting necessarily reside in the perfection of the outlines and the colours.

In Sculpture, or the plastic art, the artist first embodies his idea in a model, generally of clay. From this he makes a mould in sand, if his work is to be cast in metal; or in plaster, if his work is to be of that material. Or he carves his subject out of the solid material, be it wood, stone, alabaster, or ivory. He executes his representations in various degrees of *relief;* in coins and medals it is in low relief (*basso-relievo*), and similarly in works executed in marble, stone, or metal. This degree of relief, in which the subject is detached more or less from the flat ground, may be increased, until *mezzo-relievo* is produced; the next stage is *alto-relievo*, in which the figures are but slightly attached to the ground; in the last stage, the figures are entirely detached from the ground, forming what is termed "the round" (*rondo-bosso*).

The productions of the sculptor are copied and multiplied by various mechanical methods; the commonest is by plaster casts; they are also copied in metals, as bronze, zinc, iron, by the process of founding or casting, and by the galvano-plastic art. There are also carving machines for producing *fac-similes*.

Photography, as will be seen by an examination of the annexed Table, belongs to the section of graphics or design.

It affords a means of obtaining, mechanically, reproductions of the artist's design in sketches or finished pictures, but only in chiar-oscuro. Colour is wanting. In this respect it is on a par with various styles of engraving. It is also applicable to the copying of engravings. Lastly, as a branch of optical technics, it reproduces the effects of aerial and linear perspective, in studies from Nature. The various processes by which these effects are obtained belong to the department of photographic chemistry.

Thus, the position occupied by photography among the fine arts is, firstly, that of the artist who designs in monochrome; and, secondly, that of a mechanical copyist of artistic designs.

A GENERAL CLASSIFICATION OF THE FINE ARTS, SHOWING THE RELATIVE POSITION OCCUPIED BY PHOTOGRAPHY.

I.—GRAPHICS, OR DESIGN.

A. 1. Drawing and Colouring:—

Outline; Light and Shade; Form; Relief; Chiar-Oscuro; Colour; Tone; Tint; Hue; Monochrome; Camaieu; Polychrome; Harmony and Contrast; Æsthetics of Colour.

2. Materials used in Painting:—

Pigments; Oils; Varnishes.

3. Painting:— . . .	(*a*)	With a *Water Medium.*
On *Paper* . . .		Water Colour Painting.
On *Canvas*, or *Hard Plaster* . .		Distemper, or Tempera; Scene Painting.
On *Walls* — on *Wet Plaster* . .		Fresco Painting.
Painting:— . . .	(*b*)	With a *Wax Medium.*
Encaustic Painting.		
Painting:— . . .	(*c*)	With a *Varnish Medium.*
Enamel: Vase Painting, Porcelain Painting, Glass Painting.		
Painting:— . . .	(*d*)	With an *Oil Medium.*
On Canvas; on Wood; on Copper; on Walls (hard and dry).		

B. Classification by Subjects:—

Historical; Portrait; Landscape; Marine; Flower; Fruit; *Genre;* Miniature.

C. Mechanical Reproduction of Paintings:—

Chromo-lithography; Tapestry; Embroidery; Photography; Heliochromy.

D. Engraving:—

(1.)	On *Wood* . .	Xylography.
	On *Copper* . .	Chalcography.
	On *Steel* . .	Siderography.
	On *Zinc* .	Zincography; Chemitypy; Photo-zincography.
	On *Stone* . .	Lithography; Litho-photography.
	On *Glass* . .	Hyalography.
	On *Porcelain* . .	Lithophany.

(2.) Styles and Methods:—

Etching; Line; Stipple; Chalk; Aquatint; Mezzotint; Lithotint; Mixed Methods; Niello; Heliography.

(3.) Mechanical Reproduction of Engravings:—

By *Electrotyping:* Glyphography; Stylography; Galvanography.

By *Lithography:* Zincography; Anastatic Process.

By *Photography:* Photo-zincography; Litho-photography, Damasquining; Heliography.

II.—MOSAIC.

In *Wood* . . .	Tarsia; Marquetry.
In *Glass, Stones, &c.* .	Walls; Windows; Pavements.
In *Wool* . . .	Carpets; Tapestry.
Ornamental Bricks and Tiles .	Tessaræ.

III.—THE PLASTIC ART, OR SCULPTURE.

A.	Modelling . . .		in Clay.
B.	Moulding . . .		in Plaster, and Sand.
C.	Carving		in Wood, Ivory, Alabaster.
D.	Casting, or Founding		in Plaster and Metals; *Statuary* in Bronze; Iron, Brass, Zinc, Gold, Silver, &c.
E.	Sculpture . .	(*a*)	in Marble, Stone, &c. *Statuary.*
		(*b*)	in Shells; Cameii.
		(*c*)	in Precious Stones, Gems, Seals, Rings, &c. (Intaglios.)
		(*d*)	in Metals; Coins. Medals.
F.	Embossing		Punched work (*Repoussée*).
G.	Chasing . . .		Niello; Monumental Brasses, Tablets, &c.
H.	Ceramic Art . . .		Pottery; Porcelain.

I. Forms of the Plastic Art:—

(*a*) Basso-Relievo; Mezzo-Relievo; Alto-Relievo; Rondo Bosso.

(*b*) Forms of Nature; Forms Created by Art.

J. Subjects of the Formative Art:—

Mythological; Subjects from Human Life; Subjects from the Rest of Nature.

K. Mechanical Reproductions:—

(*a*) Plaster Casts; Parian; Terra Cotta.

(*b*) Galvanoplastics; Bronzes.

IV.—OPTICAL TECHNICS.

Perspective:—

Linear Perspective.

Aerial Perspective:—
Panorama, Diorama, Cosmorama.

The Camera Lucida.

The Camera Obscura. Stereoscope.

Heliography.	Photography:—		
	On Metal Plates . . .		Daguerreotype.
	On Glass Plates	*Albumen* .	Niepceotype.
		Collodion .	Archerotype.
	On Paper		Talbotype; Calotype.

V.—ARCHITECTURE.

Construction: Styles; Decoration; Ornamentation: Furniture; Utensils; Vessels; Weapons.
Landscape Gardening.

VI.—REPRODUCTIVE ARTS.

1.	Graphics	In Chiar-oscuro; Monochrome.	By Engraving; Heliography, Anastatic Process.
		In Polychrome	By Chromo-lithography; Tapestry; Embroidery; Mosaics.
2.	Plastics		By Plaster Casts; Parian; Terra Cotta; Bronzes; Galvanoplastics; Mechanical Carving.

TRANSFERRING COLLODION NEGATIVES TO WAXED PAPER.

BY M. TOULOUSE.

The processes hitherto published, for transferring collodion negatives obtained on glass, have had the effect of reversing the natural position of the *cliché*, making the surface that was adherent to the glass become the exterior surface. The result of which is, that a positive taken from the transferred negative gives an image in which the objects change sides, and this serious inconvenience can only be obviated by interposing in the camera the thickness of the glass between the film and the action of the light.

M. Toulouse's method gives to transferred negatives all the advantages required; for the negative, after being transferred, is in the same position on the paper as it was upon the glass.

This method appears calculated to be of eminent service to photographers. It is simple and easy in practice, and will enable the photographer to undertake a journey unincumbered with a large number of glass plates, and to return with a good number of negatives in his portfolio, from which he may obtain positives rivalling in delicacy those obtained from negatives on glass, and which sometimes even acquire, after being transferred, a vigour which they previously lacked.

This method is particularly applicable to unvarnished negatives, especially when they are prepared with a collodion not very tenacious; it also succeeds as well with negatives developed with sulphate of iron as those developed with pyrogallic acid, and even with an alcoholic collodion. Even if this method required the preparation of a special collodion, the advantages it offers would, doubtless, induce operators to modify their formulæ to suit it.

TRANSFERRING UNVARNISHED NEGATIVES.

Requisites for the Operation.—As, before commencing operations, it is important to have at hand everything necessary to be made use of, the following list will serve:—

1. A T square.
2. A sharp, round-pointed knife.
3. A sharp eraser.
4. A stand for the plates, which may be replaced by four corks fastened with sealing-wax upon four pieces of glass.
5. A flat varnishing camel's-hair brush, of about 1½ inches in width.
6. A small camel's-hair pencil.
7. Two glass triangles.
8. A thin drawing board, about 4 inches larger than the negative to be transferred.
9. A thin board of sycamore or deal wood.
10. A glass of filtered water.
11. A bottle of solution of gum arabic, pure, white, and of a syrupy consistence.
12. A small glass, to hold the gum necessary for the operation.
13. A small camel's-hair brush to spread the gum.
14. A small piece of fine sponge.
15. A sheet of positive paper, a quarter of an inch larger than the negative to bo transferred. It must be quite smooth, and free from all asperities.
16. A sheet of waxed paper of the same size.
17. Two sheets of blotting paper of the samo size as the drawing-board (8).
18. A sheet of glazed Bristol board, the size of the drawing-board.
19. A wooden roller, 1½ to 2 inches in diameter.
20. A box of drawing-pins.
21. Three or four strips of glazed Bristol board, 1½ inches in width.

Cutting the Edges of the Negative.—Place the glass plate, negative upwards, upon a sheet of blotting paper, and, with the knife and T square, cut a line round the four sides of the plate, as near as possible to the edges, or as may be otherwise desirable. Great care must be taken that the collodion be cut through completely. The object of this operation is to facilitate the removal of the collodion, without its being held by the roughened edges of the glass.

It would be preferable to use, instead of the knife, a cutting roller (rowel), which, pressing against the T square, would cut through the film without tearing it away, which sometimes happens when using the knife, if pressed too strong on the glass. Sometimes, also, the collodion gathers under the edge of the knife and prevents its cutting through the film; this never happens when using the rowel, but it is necessary that it be perfectly circular and very sharp, else it will not act effectually.

Removal of the Collodion Film.—This operation being the most difficult of the whole process, it must be minutely described, and the operator must exercise every care in it. The negative being placed on the support, take the sheet of positive paper and lay it on the drawing-board, and with the flat brush (5) moisten it with water on both sides.

When the sheet of paper has thoroughly imbibed the moisture, moisten the collodion film with a little water in the brush, and then lay the moistened sheet of paper upon it, commencing at the lower extremity of the negative, pressing it down very equally all over.

If any foreign substance is found interposed between the film and the paper, it is removed with the small camel's-hair pencil moistened, if it be on the collodion film, or with the eraser if it be on the paper.

Taking a glass triangle, it is moved in every direction over the moistened paper, in order to render its application complete, and to make the water penetrate the collodion film, so that it may be readily detached from the glass.

From time to time one of the corners of the glass must be raised, at the same time raising a corner of the collodion film with the eraser, to see if it be disposed to detach itself from the glass. This imbibition of the collodion is effected in a few minutes. When the proper moment has arrived, the triangle is passed for the last time in every direction over the paper, so as to drive out all the excess of water, then the operation is completed by sponging the paper and the edges of the glass, and afterwards applying a sheet of blotting-paper over the whole, to take up the superfluous moisture.

Viewing the negative, then, as a transparency, we select the angle that appears the most coherent, and, if possible, that by which the excess of collodion was poured off, and then place this side of the plate upon the support on the side opposite to the operator.

Then, with the left hand, gently raise the corner of the paper covering the angle selected, and when we arrive at the corner formed by the incision of the edge of the collodion, take the eraser in the right hand, and apply it to this corner of the moistened paper, and allow it to remain there a moment. Removing the eraser, we continue to slowly raise the paper, which brings the collodion with it, watching it meanwhile, and if any portion of the collodion adheres to the glass the eraser must be carefully applied to it, and the paper allowed to return upon it, to cause it to adhere to its surface. When the raising of the paper, which should be in the direction of the opposite angle, has reached one-half, it is prudent to guide the paper with the left hand, in order to prevent its too sudden removal, by which it might become torn.

(*To be continued.*)

SCIENTIFIC GOSSIP.

The article on "Colour in its Relation to Photography," which occupied the first page of our issue of the 8th inst., has called forth some valuable remarks from a correspondent whose communications have frequently been perused with interest by the readers of the "Photographic News." "F. C. S."—for these are the initials under which he chooses to appear before the photographic world on this occasion—considers that there are, in the above-named article, amongst a number of statements and definitions likely to prove serviceable, as tending to diffuse a more accurate and precise knowledge of some of the principles involved in the phenomena of colour, a few points which require some amplification, in order to prevent the diffusion of what may be designated the "germs of error." Thus the pigment, ultramarine, is scarcely a well-selected illustration of *purity of* *colour;* but the statement which it is more important to comment upon bears reference to the product of the union of blue and yellow. There has been much discussion as to the cause of the green ordinarily resulting from their admixture in the form of pigments, for no such colour is apparent on causing to overlap the blue and yellow bands of a pure solar spectrum, nor is it possible to produce a green by the coalescence of blue and yellow, when surfaces painted with these are made to rotate rapidly, as in experiments with the *colour top.* It is usual to explain this circumstance, by stating that green is the only colour to which both blue and yellow are diaphanous, and hence this colour will appear in all ordinary cases, as when, for instance, blue and yellow glasses placed together are viewed by transmitted light, or when solutions separately exhibiting these colours are mixed; but whether such an explanation is fully adequate to account for all the phenomena observed under this head, might well become a topic of discussion in the pages of the "PHOTOGRAPHIC NEWS."

The subject of arsenic in collodion having recently attracted some little attention, on account of the curious effects which are said to result from its employment under certain circumstances, it will be as well to place before our readers a short account of what has hitherto been observed on this subject. With some samples of collodion, and with the usual pyrogallic developer, there is great difficulty experienced in obtaining negatives with a sufficient degree of density in the dark parts to print white and clean. To remedy this defect, several suggestions have been made. One of the first was by Mr. Hardwich, and consisted in the employment of a few drops of an alcoholic solution of glycyrrhyzine to each ounce of collodion. This, although perfectly successful in the hands of an experienced operator, did not give general satisfaction, and other means for effecting the same object were sought after. One of the most successful of these was the intensifying process of Professor Draper, in which the negative, after fixing, had a solution of chloride of palladium poured over it. This, however, did not prove very successful; and it has now been found out, that by the addition of a little bromide or iodide of arsenic to collodion, some curious intensifying properties are communicated to it. The bromide of arsenic is to be dissolved in absolute alcohol until it is of the colour of port wine, and then one drop of this solution is to be added to each ounce of any good iodised collodion. The difference which will be caused in the working properties of the collodion by this addition will be extraordinary. A sample which ordinarily would develop slowly, and only gradually, and sometimes incompletely acquire intensity, will, after the addition of the bromide of arsenic, develop rapidly, and very quickly acquire intense opacity and blackness, with full development of all the details; after which, no further action or fogging occurs. The chief value of the arsenical addition is said to be when the nitrate bath is acid with nitric acid, and will only give a thin picture, with no intensity as a negative. The real beneficial effect of the addition of these compounds of arsenic remains to be proved; it is not unlikely that it may turn out that the increased blackness and intensity is only apparent, arising from an alteration in colour merely, as is now found to be the case with the palladium intensifying process. The exact effect of the arsenical collodion upon the silver-bath remains to be seen; from *à priori* reasoning, we should be inclined to say that it would prove very injurious to a bath in good working order. We shall be glad to hear what results any of our readers have met with whilst experimenting in this direction. Should the addition of bromide of arsenic to collodion prove a trustworthy intensifier, it will be a great boon to all photographers, especially if what some meteorologists assert be true, that the present abnormal atmospheric conditions are likely to continue all the summer, with but the variety occasioned by the occurrence of a violent thunder storm at intervals.

In reference to the method by M. Toulouse, for removing the film from glass to paper, recently given in the "PHOTOGRAPHIC NEWS," Mr. T. Barrett writes to draw attention to the communication which he made at page 203 of our first volume, on "Illuminated Paper Stereograms." The plan there recommended is a simple, and, with ordinary care, a successful method of transferring negatives either to waxed or unwaxed paper. We have recently seen a negative so transferred by Mr. Barrett, which certainly leaves nothing to be desired. It is sufficiently transparent to print from, and could easily be rendered more so by brushing over with melted wax. This plan would have some advantages over the one proposed by M. Toulouse; when covered with the gutta percha varnish, the film becomes tolerably tough.

Critical Notices.

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Stereographs of the English Lake District.

By A. PETTITT.*

SOME two hundred "Artistic Studies of the Scenery of the English Lakes" is no insignificant contribution to the Stereoscopic Treasury. In this "Fairy Land" of England, the mention of any place within its domain awakens associations with scenes of poetic beauty, that are hallowed and immortalised by the pens of Wordsworth, Wilson, Southey, and Coleridge. The mere catalogue of these charming views is of itself a poem. What delightful reminiscences are called up by such titles as "Elleray," the bridal home of Professor Wilson; of "Grassmere Church," the poet's last resting-place after his life's *Excursion;* of the "Cottage where Hartley Coleridge died;" of "Rydal Mount," where Wordsworth died; of "Grassmere Lake;" of "Ambleside;" of "Rydal Lake;" of "Furness Abbey;" of "The Fairy Glen, Grassmere;" of "Wordsworth's Grave, Grassmere;" of "The Wishing Gate;" of "Fox How," the residence of the late Dr. Arnold; of "Scale Force, Buttermere;" of "The Birth-place of William Hogarth;" of "Coniston Old Man;" "The River Duddon," "Derwentwater," "Keswick," "Skiddaw," "Helvellyn," "Borrowdale," "Lodore," "Ulleswater," and "Windermere," with all the beauty of its intermingling isles,

> "Wooded Winandermere, the river lake."

Every view in this extensive series is distinguished either for its intrinsic beauty or local interest; therefore, as we cannot specify them all, it becomes a task of much difficulty and some delicacy to make a selection that shall not appear invidious. Among the views distinguished for their natural beauty we may instance "Dungeon Ghyll, Great Langdale;" "Kirkby Lonsdale Bridge, and River Lune;" "The Path to the Upper Falls, Rydal Park;" "Foot Bridge, Rydal Park;" "Coniston Old Man." "The Margin of Grassmere Lake," the most beautiful place in the Lake country—with its craggy coppices and intervening green fields shelving down to the lake margin, and the distant mountains, form a magnificent composition. "The Smithy Bridge, Legberthwaite;" "A Westmoreland Cottage"—a perfect model of such architecture, breathing the very spirit of Westmoreland. The long vale of the "Troutbeck," where Hemans warbled her native wood-notes wild, in her poetic bower, fitly called "Dovenest"—has numberless picturesque cottages of this kind, which seem to have been constructed with the most just appreciation of a sense of the picturesque. The "Ferry House," one of the prettiest places in all Windermere, where the romantically inclined love to spend their honey-moon.

In an English village, the most beautiful spot, or one calculated to raise the purest devotional feelings, is generally the church-yard. The world's pilgrim finds not its parallel in other lands. Its influence lies in its simplicity, where Art has done the least to improve or mar Nature. Enter the church, and you will realise the beauty of these fine lines in the "Excursion:"

> "Not raised in nice proportions was the pile,
> But large and massy; for duration built,
> With pillars crowded, and the roof upheld
> By naked rafters, intricately cross'd,
> Like leafless under-boughs, 'mid some thick grove,
> All withered by the depth of shade above."

But perhaps the lake wins most admiration from the lover of the picturesque; at the sight of this, associations swift as light are gathered into one emotion of beauty. The eye wanders delighted over the massive tree tops, often dense as one single tree, till it rests in full satisfaction on the distant mountains. Only the pen of the poet is fit to accompany these transcripts of Nature. The painter's pencil is baffled in any attempt to depict the magic witchery of earth, air, and sky of the English Lakes; but in the stereoscope they appear vivid and truthful, and what may be deficient the imagination can readily supply.

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Adhesive Photographic Labels.

Messrs. Horne and Thornthwaite have issued, in a book form, "A complete Set of Adhesive Photographic Labels, of nearly 100 Varieties." They will be found very useful to the photographer, in preventing the commission of error arising from employing a wrong agent, in consequence of its bottle or package not being properly labelled. Labelling is considered a troublesome precaution, and is often neglected; but with the facilities afforded by this little book of labels, there can be no excuse for neglecting so important an element in good photographic management.

Photographic Chemistry.

PURIFICATION OF ACETIC ACID.

Messrs. Terreil and Chateau have patented a new process for purifying crude acetic acid from the tarry matters that accompany it, by avoiding the expensive operations at present employed for separating these impurities. These operations consist in saturating the crude acid with chalk, the double decomposition of the resulting acetate of lime by sulphate of soda; the acetate of soda is heated to a temperature of 400° to 500° F., to decompose the empyreumatic matters with which it is contaminated, during which operation spontaneous combustion not unfrequently takes place, which destroys all the material.

The new process consists in treating the crude acetic acid with ordinary sulphuric acid, in the proportion of 5 to 15 per cent. of acetic acid, according as it is more or less contaminated with tar; the sulphuric acid may be replaced by any other acid more fixed than acetic acid, but the inventors give the preference to it, both on account of its fixity and its economy.

In this simple operation, the combination of tar and acetic acid existing in the products of the distillation of organic matters is decomposed, almost all the tar is immediately separated, combined with the sulphuric acid added. It is left to repose for four and twenty hours, during which a heavy deposit subsides. The acetic acid is separated from the tar by decantation, or any other means; it is then distilled to separate it from the combination of tarry matters and sulphuric acid with which it is still contaminated. The liquid may be distilled immediately after the sulphuric acid is added, without waiting for it to subside.

The acetic acid thus obtained is very limpid and almost colourless; it does not darken in the air like the acid at present manufactured, nor does it deposit any tar. It is next saturated with soda, or carbonate of soda, and after evaporation we obtain crystals of acetate of soda, slightly discoloured by the mother waters. By re-crystallisation, the crystals are obtained nearly pure and colourless.

The acetate of soda thus obtained, although entirely free from tar, still retains an empyreumatic odour; it is purified from smell and colour by passing a solution of the acetate through well-washed animal charcoal.

All the acetates more or less discoloured may be transformed into white acetates, by re-crystallising them two or three times. But, as this method is very expensive, it is simpler and more economical to effect the purification by washing the coloured crystals methodically with solutions, more or less saturated, of white acetate of soda, as is practised in sugar refining, and the refining of saltpetre.

The animal charcoal used in decolourising the impure acetate may be recovered in a state fit for performing the same service, by calcining it in closed retorts.

(*To be continued.*)

Dictionary of Photography.

Oxalate of Iron.—A combination of oxalic acid with protoxide of iron. The oxalate of the peroxide is an important salt in photography, inasmuch as its solution affords the means of measuring the actinic power, by observing how much of it becomes decomposed in a given time; thus forming the element of a sensitive photometer. The light has the effect of reducing the peroxalate to a protoxalate, with evolution of carbonic acid gas, in quantity proportional to the intensity of the actinic power and the duration of its action. Peroxalate of iron is obtained by decomposing perchloride of iron by oxalate of potass. It is thrown down in the form of a yellow powder, almost insoluble in water, which is taken up by an excess of oxalic acid.

Oxidation.—The phenomena of the combination of oxygen with other bodies. Oxygen appears to be the dominant chemical power in nature. Its universal presence in the atmosphere, from which it is easily separated by bodies having an affinity for it, is constantly effecting changes in organic bodies, converting them into inorganic. Life itself is a constant struggle against the decomposing power of oxygen; breathing is a slow combustion of the blood by means of oxygen. Oxygen takes a part in most of the operations of art—those effected through the agencies of air or water—of which it forms a part. Oxidation, and *de*-oxidation, or the depriving a body of its oxygen, form a clue to the more important photographic changes, as in actinism, and in "developing." Pyrogallic acid and sulphate of iron are important deoxydising agents.

Oxyacids.—Most of the acids at present known are combinations of two metalloids, or of oxygen with a metalloid, or with a metal; such as nitric acid, which consists of one atom of nitrogen combined with five atoms of oxygen; sulphuric acid, which is a compound of one atom of sulphur with three atoms of oxygen, &c. The term *oxyacid*, given to this class of compounds, distinguishes them from the hydracids or acids into which hydrogen enters, as hydrochloric acid. The bodies, whether simple or compound, which form hydracids with hydrogen, are termed halogens.

Oxybases.—Most of the bases known are compounds of a metal with oxygen; therefore the most numerous and important salts are *oxy*-salts. But there is also a considerable number of sulpho-salts, or salts formed by the combination of an electro-positive metallic sulphide, or *sulpho-base*, with an electro-negative metallic or metalloid sulphide, or *sulpho-acid*. There are also similar compounds of chlorine, which form *chloro-bases*.

Oxygen.—A colourless gas, without taste or smell. It is doubtless the chief constituent of natural bodies, but is not found pure or isolated. It constitutes eight-ninths of the weight of water, and one-fifth of the atmosphere we breathe. It combines with almost all simple bodies, producing by the combination a great multitude of compound bodies. In appearance it cannot be distinguished from atmospheric air, but it has a greater density. It dissolves in a very small quantity of water, and is a strong supporter of combustion, as bodies burn in it much more vividly than in atmospheric air. Oxygen is indispensably necessary for respiration. An animal perishes in a few moments in an atmosphere deprived of oxygen.

The properties of oxygen require to be well understood, in order to comprehend the various processes of photography.

Oxyhydrogen Light.—When hydrogen and oxygen gases are mixed in the proportions in which they combine to form water, they burn with an intense heat, but give no light. If, however, the flame produced by the mixed gases be projected upon a cone of lime, a brilliant white light (the so-called lime light, or Fitzmaurice light) is produced, which has been proposed for illuminating objects to admit of photographic pictures of them being taken at night.

Oxysalts are either basic, acid, or neutral. Their nature is generally determined by the changes of colour they effect in litmus paper; but these indications are only relative, not absolute. The character of the oxysalts is easily determined only when they are formed by the combination of powerful bases with energetic acids.

(*To be continued.*)

The Amateur Mechanic.

PAPER.

Some recent writers on the Japanese empire have told us that paper appears to be the be-all and end-all of Japanese manufactures, this useful material forming an important item in the production of almost every article of utility or ornament. Without affirming that it will be found thus universally applicable to the purposes of the amateur mechanic or photographer, we may suggest that its lightness and cheapness, the facility with which it may be modelled to almost any shape, and sufficient rigidity communicated to it by pasting several thicknesses together, should point to its suitability for many purposes to which it has not yet been applied. We shall here merely suggest the modes of using it, adding one or two illustrations, leaving the working out to the amateur himself.

A few words first on the different adhesive substances used for joining paper. For many purposes, nothing is better than paste, as it may be kept always ready for use at a moment's notice, is easy to work, and adheres very strongly. It dries, however, somewhat slowly; and where articles requiring rigidity are to be made, it is inferior to glue; and as it is apt to ferment, and generate acidity, it is unfit for mounting photographs. It should be made of good wheaten flour, about a tablespoonful, or a little more, to half a pint of water. For some purposes, a pinch or two of powdered alum, and in some cases powdered resin, are supposed to improve its quality; and to add to its keeping qualities, some persons are in the habit of adding a little corrosive sublimate; we have, however, made a good deal of excellent paste, without any of these additions. The flour should be mixed first with a very small quantity of water, so as to get it into a smooth paste, free from lumps. The requisite quantity of water must then be added, sufficient to make what the cook would call a thin batter; it is then to be placed in a pan on the fire, and stirred from time to time, without much intermission, with a wooden spatula; as it approaches the boiling point, it will begin to thicken very considerably. Some persons, fancying they require thick paste, would remove it from the fire at once, concluding that it was sufficiently cooked. In this case the paste is thick without being strong; its adhesive properties have not been fully developed, and it is not pleasant to use. It should be suffered to boil not less than five minutes, being kept vigorously stirred all the time. When it has boiled a short time, it will become less thick and stiff, becoming more fluid, glutinous, and homogeneous. It should then be removed from the pan into the vessel in which it is intended to be used—a deep jar being more suitable for keeping it than an open shallow vessel. For convenience in cleaning, the pan should be filled with water at once, as otherwise the remains of the paste will harden on, and be afterwards difficult of removal.

A paste which may, without danger, be used for mounting photographs—not being so liable to fermentation, and, if used tolerably fresh, quite free from risk of any acidity—is made from starch: what is called patent starch, and sold in the form of a powder, answers best; it is also better free from the blue colour which is added to some samples. A teaspoonful of the starch is placed in a jar, and mixed with the smallest quantity of water (warm water is best) that will make it into a paste, smooth and quite free from lumps. From four to six ounces of *boiling* water are then to be added, the paste being briskly stirred all the time. If the water be quite boiling, and the process properly managed, the whole mass becomes, in a few seconds, a thick, glutinous, transparent jelly. If any lumps or extraneous matter be now seen in it, they may be removed by straining it, whilst warm, through a piece of clean net or open muslin. When cold, it will form a thin, glutinous paste, and is, in that state, fit for use. It should be spread on the photograph with a hog's-hair tool, by which means a much smoother and thinner layer can be spread than with the flat camel's-hair brush we have frequently seen used for the purpose. The photograph should be rubbed firmly down, a sheet of paper being placed over it to prevent abrasion or soiling of the surface. If it be desirable to prevent any warping of the mounting board, it should be damped at the opposite side previous to laying down the photograph.

Next to this starch paste, we prefer gum arabic for mounting the photograph. But it should be used quite fresh, and made with boiling water, which renders it less liable to acidity; and it should be used very thick, or it will come through the photograph and cause stains. Fine glue, or gelatine, are also useful for the purpose, and may be used without risk to the photograph; but they require to be used hot, and of exactly the right thickness, or they are unmanageable in getting a thin, even layer, just sufficient to make the photograph adhere, without showing inequalities in the surface when dry. A solution of gutta percha in benzole has been recommended for the purpose; but it is somewhat difficult to make a solution of the proper thickness, and more difficult to keep it so, besides being troublesome to use; and as its advantages are not commensurate with the trouble, we do not recommend it for the purpose.

In mounting photographs on a board with a margin, we have frequently seen gauges for cutting the picture to the proper shape previous to mounting, made of pieces of zinc, card, &c. These are always inconvenient, as it is impossible to see the position the figure occupies in regard to the oval or dome when it is covered up with the zinc gauge or pattern. These patterns should be made of glass cut to the right shape, as it is then easy to see whether the figure is in a proper and central position before cutting the picture to the proper size and shape.

To return to the subject of making various articles of paper, we may mention that for this purpose glue is often preferable, as drying more rapidly, and giving greater firmness and rigidity to the article, which is often a point of importance.

Of the choice and preparation of glue we spoke in a recent article on the subject "wood" in this series. It is only necessary to add, that for paper work it should be just of sufficient consistency to work easily; dropping from the brush in a thin filament when lifted from the pot. If it pull out ropy and thick, it requires more water; if it run in single drops, without drawing into filaments, there is too much water.

To illustrate the mode of proceeding in making articles, we will suppose a cap for a lens is required. The lens itself, or rather the brass tube, will form the mould on which to work the paper. To protect the brass-work from being smeared with the glue, it should be wrapped with a single thickness of paper first, which will afterwards be removed, and form no part of the cap. A lining of cloth or velvet, or any substance not liable to scratch the brass or become chafed itself, will be desirable. A strip of this of the right width, and rather more in length than the circumference of the tube, is to be cut, and drawn tight round, wrapping over half an inch or an inch; this portion is to be glued and pressed down; it may be tied for a few minutes with a piece of tape to hold it until the glue is sufficiently set to remain firm. A strip of cartridge paper or smooth brown paper of about two inches broad, and sufficient length to wrap round the tube six or eight times, is now required. This is to be coated with glue and wrapped round the lens, glueing it to the velvet lining already there. The strip of paper must be wrapped on the tube just the distance that is intended for the depth of the cap: it should project over the edge of the velvet lining about the twelfth of an inch, and project over the end of the tube about an inch. The edges which project over the end should be cut in about half-a-dozen places, so as to bend them down at right angles with the rim being formed. When one or two coils of the paper have been made, and the projecting edges turned down, a disc of cardboard, of the diameter of the tube, is to be cut and glued on to the pieces already turned down, so as to make the top of the cap. The glued strip being wrapped round and round, and the projecting edges turned down on to the cardboard top, when it is sufficiently secured, these edges may be cut off instead of being turned down, as more than is required will only make it clumsy. When sufficient thickness to make the rim firm and rigid is obtained, the whole may be covered with leather, or glazed bookbinders' cloth, or velvet, as may be convenient; the edge of this covering is to be turned in on to the portion of the paper, projecting a twelfth of an inch beyond the velvet lining. A disc of velvet is now glued in to line the top; and when it is quite set, a firm and useful cap, more convenient in many respects than the ordinary brass cap, is completed.

In our next we shall offer some suggestions on developing trays, dark slides, &c., of paper; and in that article we shall complete the series of the "Amateur Mechanic," having, we trust, offered suggestions on the manipulation of various materials sufficient to develop and direct the ingenuity of many thousands of our readers.

(To be continued.)

A Catechism of Chemistry.

SPECIFIC GRAVITY—(*continued*).

Q. SUPPOSING it is wished to ascertain the specific gravity of a solid which is in too fine a state of division to suspend by a hair, how is the specific gravity then to be taken?

A. The specific gravity of a powder is taken by a similar means to that employed in taking the specific gravity of a liquid. Take the specific gravity bottle, described in our last as holding exactly 1,000 grains of water; weigh into it a known quantity—say 150 grains—of the powder under examination. Supposing that the powder occupied no space, the flask would still hold 1,000 grains of water, and the combined weights of powder and water would be 1,000 + 150 = 1,150 grains. Upon experiment, however, it is found that the powder and water together weigh only 1,096 grains; the powder has, therefore, displaced 54 grains of water. From these data the specific gravity of the substance under examination may easily be calculated.

Q. By what rule?

A. The rule is as follows:—

The weight of water displaced : Specific gravity of water : : Weight of powder taken : Specific gravity of the powder.

Or 54 : 1·000 : : 150 : 2·764, which is the specific gravity of the powder employed in our experiment, viz., fine quartz sand.

Q. Supposing the substance be a solid, but one which is soluble in water, how can its specific gravity be taken in that case?

A. If the substance be soluble in water, it must be weighed in air, as usual; then in spirits of wine, turpentine, oil, or in some liquid which will not act upon it, and the specific gravity of which is known. The specific gravity of the solid can then be easily calculated.

Q. If the body is lighter than water, how can its specific gravity be told?

A. It must be attached to a lump of metal, or other body, the weight of which in water has been ascertained, and which is sufficiently heavy to keep the lighter body beneath the surface; the weight of the two bodies in water is then deducted from the weight of the heavier solid in water. If to this remainder we add the weight of the lighter body in air, we shall have the weight of a bulk of water equal to that of the lighter solid, and from this the specific gravity may be easily calculated.

Q. What is the hydrometer?

A. The hydrometer is an instrument used for taking the specific gravity of liquids.

Q. What is the construction of this instrument?

A. It consists of a hollow ball fastened on to the lower part of a graduated stem. A counterpoise is placed at the lower part of the hollow ball, so as to cause the instrument to sink just so far into a vessel of water, that the stem is immersed up to a certain mark. It is evident that, when so placed, it displaces an amount of liquid equal to its own weight; and, therefore, if it is immersed in a liquid lighter than water, it will sink deeper, and if in a liquid heavier than water, it will not sink so far. The stem being graduated to any convenient scale, enables the operator to read off the specific gravity or other required density by mere inspection.

Q. Are there different scales to hydrometers?

A. Yes; there are two in common use in this country—Beaumé's and Twaddle's. They are of frequent use in obtaining rapid approximate results for different purposes of the arts, the excise, and other cases in which extreme accuracy is not material.

MOLECULAR ATTRACTION.

Q. What is meant by molecular attraction?

A. Forms of attraction which differ from gravitation, and other similar forces which act at a distance, inasmuch as they are only exerted through distances so minute as to be inappreciable to our unaided senses.

Q. Name some forms of this force.

A. Molecular force may be divided into *elasticity*, *cohesion*, *adhesion*, and *crystalization*.

Q. What is meant by elasticity?

A. Elasticity is the resistance which a substance offers to compression or extension, and the power which it possesses of regaining its original bulk when the coercive force is withdrawn.

Q. Are all bodies elastic?

A. They may all be said to be elastic, but they differ enormously in their degrees of elasticity.

Q. Are any bodies perfectly elastic?

A. Yes; gases and liquids are perfectly elastic, and, within certain limits, some solids also—such as glass, well-tempered steel, &c. All solids have limits to their elasticity, and most of them are only imperfectly elastic.

Q. What takes place beyond the limits of elasticity?

A. The solid breaks if it be brittle, as glass or steel, or it *sets* or alters in shape, as is the case with lead.

Q. Is not caoutchouc perfectly elastic?

A. By no means; for, if frequently stretched, it becomes permanently elongated.

Q. What bodies possess the most extensive properties of elasticity?

A. Gases. They are perfectly elastic, and exhibit all the phenomena of elasticity in the most striking manner.

Q. Are there any laws which regulate the elasticity of gases?

A. Yes; what is called Boyle's or Marriotte's law.

Q. What law is this?

A. The above-named physicists found out that, within the limits of ordinary experiment, "the volume of an aeriform body varies *inversely*, and the elasticity *directly*, with the pressure to which it is subjected." Thus, by trebling the pressure, we reduce the volume of a gas to one-third, but we increase the elasticity three times.

(To be continued.)

Correspondence.

FOREIGN SCIENCE.

(From our Special Correspondent.)

Paris, 18th June, 1860.

THERE is always something useful to be found in the German periodical called "Buchner's Repertorium of Chemistry," &c. In the present instance, it is a little note by M. Buchner himself, on the preparation of *bromide of potassium* for photographic purposes. The process of the author is simple, and may be executed in the most modest of laboratories. The following substances are taken in the quantities given:—

Iron filings	60 parts (by weight).
Distilled water	540 ,, ,,

To these, add in small quantities at a time—

Bromine	20 parts.

The liquid must be shaken up until it has become of a pale green colour, and has lost its odour of bromine. It is then filtered, and to it are added 30 more parts of bromine, dissolved in a weak alkaline (potash) liquid. The latter solution must be colourless; it is added, a little at a time, to the pale green bromide of iron. Finally, enough of the bromide is added to precipitate most of the oxide of iron; the remainder is thrown down with a little carbonate of potash. After one hour's repose the liquid is filtered, and the clear filtrate made to crystallise. The bromide of potassium thus obtained is pure, and by this process larger quantities are obtained than by any other.

I may add to this, that bromine being a very dangerous substance, on account of its action upon the lungs, &c., it should be manipulated with great precautions. I have heard that, in England, the small full-length portraits termed here "*cartes de visite*," have been generally admired; and I have met with some travelling photographers who had endeavoured, but without success, to discover how these card portraits were finished. The fact is, that many of our Parisian photographers give them into the hands of certain workers in gelatine, or varnish-men by profession, who cover them with a layer of gelatine or varnish, which makes the proof appear as if it had a glass over it. M. Belloc says, that this art is known in Paris alone; he adds, that this kind of varnish is not applicable to large proofs. A substance called *encaustique*, which I believe was invented by the photographer just named, has been very much used for varnishing and preserving proofs. It is made in the following manner: 100 parts (grammes) of white wax are placed in a clean vessel, in a *bain-marie;* when melted, the vessel is withdrawn, and 100 parts of essence of lavender are added to the wax; when well stirred, this mixture is inclosed in a bottle. After a proof has been treated in the usual manner, with a cold solution of gum, and passed through a glazing press, a little of this *encaustique* is taken on the finger and applied to the proof, so as to cover the paper. It is then rubbed upon the latter with a piece of woollen (merino) cloth. The polishing must be terminated with a new dry piece of woollen, and by rubbing quickly, &c. in every direction, so as to leave no streaks upon the image.

MM. Jardin and Blancoud have been applying hydrofluoric acid with success to engrave upon porcelain and stones. The porcelain is first covered with a varnish, upon which the drawing is made with a fine point. The subject is then eaten out by the acid vapours, and the vessels afterwards plunged into silver or gold baths, when a deposit of these metals is determined, in the parts corroded by the acid, by means of galvanism. In other cases, certain coloured mineral powders are rubbed into the tracings left by the hydrofluoric acid, and fixed there by the action of heat.

It is twenty years ago since M. Flourens, one of the secretaries of the Academy of Sciences, showed that when birds and pigs were nourished with certain colouring matters, such as madder, their bones became gradually coloured. The red tint penetrated the bone, layer by layer, as it were, until the whole bone was of a dark-red tint, which gradually disappeared in the same manner, when the colouring matter was no longer mixed with the animals' aliments. Now M. Flourens has just brought forward a still more curious fact—namely, that the same phenomenon of bone colouration takes place in the unborn young of animals submitted, as above, to coloured aliments. Not only are the bones of the fœtus coloured deep red, but the teeth also are deeply tinted; and so, likewise, the teeth and bones of the mother. The observations were made upon young pigs. Five were born at once; two of them died, and three are, with the mother, still living. The teeth and bones of all are coloured by the madder. The only direct communication between the mother and the interior of the embryo is by the blood. How does the fœtus breathe? How is it nourished? Evidently by the blood of the mother. All physiologists agree upon this point. But does the blood of the mother communicate directly with that of the fœtus? That was the capital question, which M. Flourens' experiments have satisfactorily answered.

Upon this occasion M. Coste has published a similar fact. The eggs of salmon whose flesh is of a red colour contain red particles, but those of salmon bred under circumstances which prevent the formation of the "salmon colour" are perfectly white.

MM. Deville and Debray have succeeded in melting 6 lbs. weight of platinum, and running it, whilst in fusion, into bars, &c. The process will be published soon. The experiments already prove that platinum, usually considered as infusible, can be melted in any quantity, and that once melted, it requires the same precautions to run it into moulds as gold and silver in the same circumstances.

M. Berthelot has been making some very interesting experiments on fermentation, by which he has shown that the yeast plant does not act upon sugar, starch, &c., by direct physiological means, as M. Pasteur thinks, but that it really secretes a soluble ferment, in the same manner that barley secretes *diastase*, or almonds a substance called *emulsine*, the stomach *pepsine*, and the pancreas *pancreatine*. It is this peculiar soluble substance that has the power of converting sugar into carbonic acid and alcohol. How that happens, M. Berthelot has not shown.*

Proceedings of Societies.

Blackheath Photographic Society.

The twenty-fifth ordinary meeting of this Society was held June 18th, 1860, at the Golf Club-house, Blackheath; the President, **Charles Heisch**, F.C.S., in the chair.

The minutes of the last meeting were read and confirmed.

The **Secretary** reported the issue of a conference of a Committee appointed to meet the delegates of the Greenwich Natural History Club, and West Kent Microscopical Society, to make arrangements for holding a *soirée* during the ensuing season, and stated that it having been found impossible to procure rooms suitable for the purpose in the neighbourhood, the Committee recommended the plan to be postponed *sine die.*

It was moved by Mr. James Harding, seconded by Mr. Marsden,—"That the report of the Committee be confirmed." Carried unanimously.

The question of a medal voted to the Golf Club, in recognition of their kind liberality to the Photographic Society, was then discussed, and letters read from the Secretary of the Golf Club, accepting the Society's offer.

Mr. **Glaisher** then read a short paper by Mr. Paul Pretsch, prefaced by a few remarks of his own, on a new process by Mr. Pretsch, for "reproducing photographic pictures by the ordinary letter-press (surface printing)." He said:—"Rapid and continuous as have been the discoveries connected with photography, and important as some of its applications have become, I think the one I am about to mention is as wonderful as any, and promises to be of the utmost importance. When the invention of M. Daguerre was made known, we all recollect the hopeful feeling that occupied our minds, that the wonderful results thus produced by nature should by human skill become permanent, and not fleeting. Since the invention of photography, it has become an elegant and highly useful art. It has stimulated inquiry and experiment in the improvement of its processes, and in the endeavour to give fixity to its productions; but, as Mr. Pretsch says, these are, he fears, still perishable. It is now some years since Mr. Pretsch mentioned to me the hope that photography would be made subservient to the quick reproduction of photographic originals, and I know that at different times he has made many experiments; but it was a bold idea, and one which scarcely seemed possible to be realised, viz., to obtain, by means of photography, a block from which to print, with ordinary printers' ink, on the ordinary letter-press (viz., surface-printing). The first specimen thus obtained I had the honour of submitting to you some months ago; and now I have several specimens, all of them absolutely untouched by the graver, and showing a great advance in the process."

PHOTOGRAPHIC PICTURES, REPRODUCED BY THE ORDINARY LETTER-PRESS (SURFACE PRINTING).

The author commenced by remarking that if the words of an eloquent speaker are capable of moving the will and actions of thousands, the same words will act upon the minds of hundreds of thousands, if they are *printed*.

In his (Mr. Paul Pretsch's) new process, now brought before this Society, is the first solution of the problem. By its means we can effect, by publishing *authentic* illustrations of events, or of works of nature and art, just what has been already accomplished for the spread of thought by printing.

We consider it a bold idea to produce, from a photographic original, by means of photography, a block, to be printed with ordinary printers' ink, on the ordinary letter-press (surface printing). But there are now the first specimens before you; all of them absolutely untouched by the graver. The inventor began with the most difficult portion of the process, with the reproduction of photographic originals, because there are no lines or markings, but only tints in the original, which must be reproduced in a certain solid substance to print from. Therefore it appears that the reproduction of drawings, or prints in lines, is somewhat easier, and a more grateful task, because there exists already the method by which the required effect may be produced. Although, he had the idea many years in his mind, and although he made numerous experiments at several times, still the inventor has solved the problem only during the last year; consequently, the invention has been conceived and executed in England.

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* Consult on this Phipson's "*Memoire sur la Force Catalytique, ou Etude sur les Phenomènes de Contact,*" which obtained the gold medal of the *Societe Hollandaise des Sciences*, in 1858.

The main advantages of surface printing by the ordinary letter-press, are rapidity and cheapness of production; if the number of copies from an engraved plate be thousands, from a block several hundreds of thousands may be produced. If the price of a print from an engraving be a few shillings, up to one or more pounds sterling, we are accustomed to pay for the productions of the letter-press in pence; and the time required for printing is about in the proportion of 1 to 20, and in some instances of 1 to 50 or more.

In comparison with his former process, consisting of the production of an engraved copperplate for the intaglio printing-press, the inventor states that the production of blocks is cheaper, and requires less time. For an intaglio printing plate, he wants after having obtained his mould in gutta percha the electro-typing of the copper matrix (about three to five days), and for the solid printing plate itself (about ten days or a fortnight); but the production of a block for the letter-press, after having obtained his mould, can be effected in twenty-four hours, and, if required, in less time; because the copper deposit for this purpose can be made rapidly, and needs to be only thin, being backed up with type metal, and fixed on a block of wood, like the specimens exhibited. The expense for electrotyping is consequently in the proportion of about 1 to 3, or 1 to 5, according to circumstances.

Both processes of Mr. Paul Pretsch, for intaglio and for surface printing, have one and the same object; it is obvious that he uses the influence of light only for the production of the *first printing plate or block;* and, having obtained this, he becomes enabled to print therefrom, with mathematical certainty, by mere mechanical means, any number of copies required.

Photography alone cannot do this; it wants the influence of light for producing each single copy, and even the various carbon and ink processes, though, perhaps, more durable than silver prints, are obliged to have light for the production of the copies required.

Both processes possess the advantage that their copies are printed with ordinary printers' ink; and though the inventor is quite sure that his first process of producing engraved copper-plates for intaglio printing will come in general use, and that the time will come when it will be applied for the publication of first-rate prints, still, considering that surface printing combines with the same fidelity of reproduction so many important advantages, we may presume that surface printing cannot supersede intaglio printing, but that it will take its due place by its side; the demand for blocks, however, may greatly surpass the demand for intaglio printing plates.

The proposition was submitted to you in February last, and these are now the first specimens. It appears that the author has fulfilled his promise, *to make photography subservient to the printing press.*

[We have seen specimens from photographic originals by this process, and were much gratified at the comparative success attained by Mr. P. Pretsch.—Ed.]

The **President** (Mr. Heisch) then introduced some photographs of fluorescent substances, kindly sent him by Dr. Gladstone, regretting that he was prevented from explaining them himself, being obliged to quit the meeting, but leaving them in the hands of Mr. Wheeler.

Mr. **Wheeler** claimed the indulgence of the meeting for any shortcomings he might be guilty of in dealing with a subject of manifest difficulty, at such a short notice. He said, members were doubtless aware, that, independently of the coloured rays exhibited by the prismatic spectrum to ordinary vision, there existed also to some extent throughout the spectrum, but chiefly at the violet end of it, invisible chemical rays, termed extra spectral (Stokes' rays), and that bodies called "fluorescent," by altering the refrangibility of these rays, became themselves visible. The substances employed to exhibit these rays, were a salt of quinine, comenate of potash, sulpho-stilbate of baryta, and esculine, the proximate principle of the horse-chestnut. Characters traced with these upon ordinary paper, and paper tinged with cobalt blue, were before the meeting, and being illuminated by the ordinary yellow, or nearly mono-chromatic light of gas, were scarcely visible; but if the light produced by the ignition of sulphur in oxygen gas were employed, such light containing blue or chemical rays chiefly, the fluorescent substances would be distinctly visible, each of its peculiar shade. He proceeded to exhibit the experiment prepared by Mr. Heisch, and the fact became beautifully evident; the quinine, especially, shining with a glistening lustre, which was seen at the extremity of the room. Mr. Wheeler repeated that this was caused by the refrangibility of the rays being altered by the fluorescent substances, and drew attention to the photographs of the characters, which illustrated their very slight chemical action by ordinary light upon sensitive surfaces. He said, he was glad to have this opportunity of extending the subject he had partially unfolded at the previous meeting, viz., the phenomena of light.

Mr. **Harding** proposed a vote of thanks to Mr. Wheeler for his impromptu explanation, which was seconded and carried and the meeting adjourned until October.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

The anniversary meeting of this Society was held last evening, in the National School-room, Shaftesbury-street, Walworth. This Society has invariably advocated the importance to photographers of a knowledge of the principles of art, and in the preparations for this, their first annual *soirée*, the hand of the artist was everywhere visible. On entering the room we were struck with the gay scene which presented itself. Festoons of evergreens and variegated flowers hung in graceful pendants from the walls and across the centre of the room; and here and there might be seen tiny banners tastefully interspersed amongst the foliage. At the extreme end of the room a raised platform, also profusely ornamented, was placed for those gentlemen who were to take part in the business proceedings, while two tables, covered with pink draped with white muslin, and decorated with different coloured flowers, ran longitudinally down each side of the room, and around them were grouped a considerable number of gaily-dressed ladies. In short, the *tout ensemble* was one calculated to please the eye and gratify the taste of all who were present.

Amongst the articles exhibited we observed several coloured photographs from the establishment of Messrs. Cotton and Wall, of Cannon-street, and also some large stereoscopic views of American scenery, contributed by the London Stereoscopic Company.

Mr. G. W. **Simpson** exhibited some specimens of photographs taken by his alabastrine process, coloured and varnished with Newman's penetrating varnish, thus rendering them non-inverted, and giving an effect resembling enamel. A peculiarity in this process is, that the photograph is *over* the colour, and not the colour over the photograph.

Messrs. **Horne** and **Thornthwaite** brought forward an optical instrument called the Trocheidoscope, for displaying various beautiful effects of the combination of colours, upon an entirely new principle. The instrument is the invention of Mr. Thomas Goodchild, architect, Guildford. The same firm also exhibited several stereoscopes and slides, among which was a magnificent view of a building in Palermo.

Mr. **Burr**, F.R.A.S., exhibited microscopes showing a photograph of the moon, produced by that luminary's own rays. The photograph was a negative, taken by Mr. De la Rue with his 13-inch reflecting telescope. He also displayed a specimen of minute writing and engine turning, produced by Mr. Peter's machine. One of these was the Lord's Prayer, written in the 2,500th part of an inch.

Mr. **Garnham** exhibited several curious effects produced by the power of the microscope. Under one—Powell and Leland's—was shown a daphnia alive; and the internal workings of the animal's body, even to the beating of the heart, were clearly visible. Under another was shown a section of the spine of an echinus, and a variety of other objects.

Mr. W. **Clarke** exhibited a new binocular camera, with an adjustment on the top of the box. The case contains four double backs, lenses, and everything necessary for the dry process.

Mr. **Tear** exhibited a view taken on a plate prepared by the Fothergill process, but for which he had used sago as a preservative agent. The picture was very intense, and full of detail.

In the room underneath the boys' school, Mr. T. Clarke meritoriously exerted himself to add his quota to the evening's entertainment, by displaying the wonders of the magic lantern, the slides being kindly lent for the occasion by Mr. Ackland. But our imperfect description must not end here, or injustice would be done to one of the most important features of the meeting. During the evening a pleasing and varied selection of vocal and instrumental music was performed. Refreshments were provided, and we understand it was intended, after the more sedate portion of the company had retired to the quiet of their homes, to clear the room for a dance, as the termination of the amusements of a very agreeable evening.

The **President** (the Rev. F. F. Statham), in opening the business of the evening, made a few appropriate remarks on the benefits that photography had conferred upon art and science during the past few years, and pointed out its importance to families in enabling them to preserve a faithful portrait of those upon whom their affections were centered in this world, and whom it had pleased Divine Providence to take away. He expressed his satisfaction at seeing so many ladies present, and in a humorous manner referred to the resolution of the Society to hold, during the vacation, meetings in the open air, by which means the wives of members would not only be enabled to enjoy a pleasant recreation, but also form an important adjunct in the picture, by being grouped artistically in the landscape. He concluded by calling upon the Secretary to read the report.

Mr. **Wall** (the Secretary) then read the following Report:—

FIRST ANNUAL REPORT OF THE SOUTH LONDON PHOTOGRAPHIC SOCIETY.

In obedience to Rule 9, your Committee proceed to lay before you this, their first annual report.

The present aspect of the Society is decidedly promising, and we may congratulate ourselves on the apparent surety of its foundation. Our members are not large in number, but we have a very fair share of vitality, and contrive to be active in our proceedings. The meetings have been tolerably well attended, but we regret that several members, whose election raised sanguine hopes, and whose names won us public respect, have not yet "put in an appearance" on our behalf; still we console ourselves with the credit of contriving to do so well without them, and the earnest hope that we may do better *with them* in the next session.

The South London Photographic Society sprang into existence on the evening of May 10th, 1859, at a meeting convened by public notice, and by your present Secretary; which was attended by Messrs. G. Shadbolt, W. Ackland, F. Howard, A. Hervé, and J. C. Leake. A Provisional Committee was formed for the proper organisation of the Society, and the first public meeting was held on the 9th of the following July.

The papers read at our monthly meetings are as follow:—

"*Truth in Art illustrated by Photography,*" by H. L. Keens, Senior.—A gentleman, not a photographer, who was an artist before photography was known, and whose sympathies might naturally be supposed to be with the traditions of art, came forward, in this and one other paper, as the champion of photography, upholding its truth, asserting its power, and appealing to it in refutation of the principles advocated by a modern vicious school of painting.

"*Practical Hints upon Positive Printing,*" by J. C. Leake, Junior. This paper, by a very successful professional operator, affords an illustration of the real practical value of such societies as our own. Although containing hints of great utility, and evincing the result obtained by very great experience and practice, it advocated a process of printing and toning, which is now generally known to be unsafe and unsatisfactory. The discussion which followed the reading of this paper was mainly instrumental in inducing Mr. Leake to abandon the old for the new alkaline gold toning-bath; and as this gentleman provides portraits for a large number of customers, we may claim for ourselves the honour of having done some good service to the public, in the increased permanency of their photographs.

"*The Difficulties of the Dry Processes,*" by W. Ackland, Vice-President. This was another paper of eminently practical value, and the information it contained must have been of no little service in diminishing the chances of failure. The various difficulties were illustrated with specimens, as well as described, and being traced carefully to their source, were accompanied with remedies which had been practically tested by the author himself.

"*Observations on Photographs in their relation to Art,*" contributed by your Secretary, in which he endeavoured to point out the exact position photography occupied in regard to art, and to show that success in the former was largely indebted to a correct appreciation and knowledge of the latter; adding hints of a purely practical description, to assist in producing results of a pictorial character.

"*On recent Improvements in Photographic Apparatus,*" by W. Clarke.—In this the respective merits of the various cameras and other apparatus were described, and specimens exhibited.

"*Failures in the Wet Process, their Cause and Cure,*" by J. C. Leake, Junior. The highly suggestive observations of a well-known efficient operator, who had encountered *and overcome* these difficulties; and the exhibition of about a dozen defective plates could but be valuable to the practical portion of our members.

"*The Iron Printing Process,*" by M. Hannaford.—This and several other short papers, by the same author, were all upon infant processes of a promising and most important description, which offer a very wide field for experiment and research, of a practical and philosophical description. We trust this gentleman may not let us want his really invaluable aid, in bringing forward such papers in the coming session.

"*On Amateur Photography,*" by Frank Howard.—Our Treasurer, in this excellent paper, dwelt with all the enthusiasm one might expect from a photographer so universally successful, on the delights of an art he had taken up in the purity of an amateur's love, although with a conscientiousness very characteristic of the man himself. He also pointed out, with the utmost precision, such shoals and rocks as beginners usually encounter.

"*On certain Experiments with the Salts of Silver,*" by Mr. T. Clarke.—Although these experiments lacked the precision necessary to increase their value, they induce us to hope that this gentleman will continue others of the same practical description, if only that they may originate the discussions from which we all derive so much benefit.

"*On the Application of Photography to Scientific Pursuits,*" by the Rev. F. F. Statham, B.A., F.G.S., President.—This was an eminently interesting and highly exhaustive paper on a subject of great suggestive importance, reviewing the applications of the art to scientific purposes, and pointing out new directions into which it might be turned with highly advantageous results.

"*Photographic Jottings.*"—In addition to these more formal papers a quantity of valuable information has been contributed, under the head of "Jottings," being brief notes of experience on some special subjects of interest. For these we have been indebted during the session to Messrs. Hannaford, Ackland, Leake, Wall, and Martin. These little friends have been, and will, doubtless, continue to be, of the greatest importance, offering as they do a medium for the communication of facts, not in themseves of sufficient importance to constitute entire papers, and a temptation to modest or timid members to embody a thought or incident of their practical experience in a form so simple and unpretending.

The discussions, we are happy to add, have been numerous and animated, eliciting much useful information.

The portfolio's claims upon the generosity of members have not been neglected, but, like an importunate beggar, its continual cry is still—"Give, give, give!"

The Exchange Club has been duly organised, and several specimens are now in the folio for exchange. Members will be very gladly received; and it is not necessary that such should be members of the Society.

By an alteration in the rules, our usual recess will be converted into a series of out-door meetings, intended for the benefit of beginners in the art, and for the purpose of exchanging in absolute practice hints which cannot be communicated with the same effect by mere words. Such meetings, it should also be remembered, will enable us to combine our experience, skill, and knowledge for the prosecution of various experiments of a practical character in connection with the pictorial, optical, and chemical elements of the art.

Numerous objects of interest have been brought forward at our meetings, in the shape of specimens, apparatus, curiosities, &c., and your Committee return the exhibitors their best thanks.

We regret that although ladies have been invited to join us, none have yet responded to our invitation. Other societies have their lady members, and we all know there is no lack of fair creatures whose dainty fingers are familiar with what has been termed "the black art" (in emulation of an example set by the highest lady in the land—our much-loved Queen). Having good reason to believe this absence to be occasioned by the fear each individual lady, naturally enough, has of always finding herself "the single lady" present, we are prepared to promise any lady who may honour us by communicating her intention of becoming a member, and attending a meeting, that pains will be taken to introduce her, upon such an occasion, to companions of the same sex.

Your Committee take this opportunity for throwing out the few hints following, for the consideration of members.

It has been suggested that the formation of a permanent Committee, for the special purpose of testing and reporting upon the value of such improvements in processes, experiments, &c., as may be found in the various journals, would tend to point out their real value, so that they might be at once either adopted or discarded. A fund (*in the event of our increased prosperity*) might be placed at the disposal of such a Committee for the incidental expense.

And at each meeting we should have a something certain to look forward to from our "experiment Committee."

A complete collection of the literature of photography, periodical and otherwise, English and Continental, to circulate among the members, is also a very desirable object of attainment, which our increased funds would enable us to secure.

A collection of first-class photographs might be added to the folio for the year, by the formation of a club, of which each member paid some trifling monthly subscription, and had in turn the privilege of naming the subject for purchase. The specimens so procured to be divided and become the property of the members at the close of each year. Any member willing to aid in carrying out this suggestion will please to give in their names to the Secretary.

While the practical is made, as it deserves to be, a most prominent feature in our papers and discussions, your Committee would suggest that theoretical and philosophical questions should by no means be neglected; "purblind practice" will sometimes "every theoretic truth disdain, and blunder on mechanically vain;" but, *as a Society*, while we should not be characterised by a puffed out pride in the mere act of languidly hoarding up embryo knowledge, we should beware of separating elements of theory and practice, which are so essential for the production of a perfect whole. Your Committee would also urge upon members the advisability of making arrangements which will enable the Secretary to announce at one meeting the subject of the paper for the next. The representatives of this or that branch of special knowledge more directly pertaining to the subject to be discussed, will then be more likely to attend, and thus improve and give increased effect to the discussions which it is so desirable should take place upon such occasions; for it must be remembered that photography has brought into harmonious relationship a number of apparently conflicting, or, at least, opposite elements, in *all* of which it is indeed seldom that we find any one or even two individuals tolerably proficient; and it might possibly happen, that from neglect of the method recommended and hitherto adopted, no gentleman was present at the reading of such paper competent to tender any observations, and thus the labour so generously undertaken in our favour might fail to meet an encouraging reception and adequate reward.

Your Committee are also desirous of discouraging the habit of permitting discussion to degenerate into the low tone of ordinary conversation. If each speaker addresses, not only his more immediate neighbour, but *the whole of the meeting*, you will easily perceive that his personal views or opinions will have the better chance of being strengthened, improved, or refuted; which, as *the advancement of the art and not the individual*, is the great purpose of our organisation, is, of course, especially desirable. Some may, from a fear of those awful beings, the reporters, hesitate to adopt our suggestion, but we can assure them, that while the pith of all remarks worthy that honour will afterwards be found in print, the mere chaff of words which they themselves do not, indeed cannot, pause to separate from the wheat of sense, will, if only for the credit of the pages in which they appear, never be recorded against them. These remarks, of course, do not apply to conversation unconnected with the subject under discussion. There are many other such hints as the preceding, which might be urged upon your attention; but we will not detain you any longer with them upon this pleasant occasion.

To take a passing glance at the more prominent photographic features of the year, will not demand many minutes. No great events, no very wonderful inventions have characterised the past twelve months of our Society's existence. Steady progress in the practical departments, quiet advance towards the artistic, have been its most praiseworthy traits.

Bottled light, which opened with a pop, and effervesced noisily all over Europe, seems again likely to be corked down. The alkaline gold-toning bath has stolen into more general use and appreciation. The construction of lenses, or their combinations, have developed nothing novel, excepting a lens of an original character (Mr. Sutton's panoramic), which, together with its camera, and other apparatus, was exhibited at one of our meetings, and which seems to offer great advantages in a largely increased angle of view, &c. Much, too, has been done in the way of reproduction during the year. We delighted to find the educational authorities at Kensington had resolved to carry into the very humblest homes of the land we live in that refining and ennobling influence which belongs to all real art, by making photography an instrument for the faithful reproduction of such costly works of the greatest painters as have hitherto been inaccessible, and beyond the means of even the wealthiest among us. Many have, however, been looking vainly and impatiently forward to the delivery of these copies, and begin to fear that some members of the "Barnacle" family may have stepped in with their "how not to do it" system. When we consider that, aided by the camera, copies of these glorious productions can be scattered by thousands among the people, at a cost purely nominal, and that to produce one such without photography's aid would require the best talent of our greatest painter, at a cost of perhaps thousands, or at least hundreds, the importance of this step must, we are sure, be acknowledged with no little gratitude and pleasure.

Many productions of high artistic merit have been published during the year, which are especially gratifying, as proofs that the almost latent pictorial power of our art is beginning to be discovered, and more generally appreciated. We may take praise to ourselves, also, gentlemen, for having been one of the few—very few—societies which, during the year, have given due attention to the principles of art in connection with photography, and denounced the more common and prominent offence against good taste and pictorial beauty.

One other subject, which we approach with some reluctance, remains to be noticed—viz., the Collodion Committee. It has indirectly done us good, perhaps, but it was certainly strange to find a body of highly talented gentlemen testing *collodions* with only *one collodion*, and solemnly and laboriously making a show of comparing, *with nothing to compare with.* Without referring to the invidious and ungrateful nature of their task, in attempting to discover the best manufacturer, instead of the best way of manufacturing, their report reminds us of some one who (under Government, of course) had nothing to do, and—with a great deal of help, and plenty of time—contrived somehow to do it. But still, let us thank the gentlemen forming the Collodion Committee for their good intentions, remembering that mistakes will occur, although it is not always policy to admit their existence.

In conclusion, we beg leave to suggest that the number in committee be increased from six to eight; that the hour of our usual monthly meeting be altered from eight to half-past seven; that as some of our members receive, in addition to that which has been chosen as the special organ of this Society, the Journal pertaining to them as members of kindred associations, and do not require the two, the yearly subscription be reduced to those gentlemen, and others similarly situated, from 10s. 6d. to 5s. 6d., and that they receive for this sum the print, and all other privileges of membership, excepting only the fortnightly Journal.

The Treasurer will now read his report, after which we will, if you please, revive, or re-create, our newly-defunct body of officers, which done, the President will be glad to receive the names of any gentlemen desirous of being nominated for election as members.

The privilege which has been granted to the members of the Walworth Literary and Scientific Institution will cease with the past year, as we have found the subscription paid less than the outlay incurred. The circulation of the Journal is stopped until the Treasurer forwards to the publishers the names of members for the coming year whose subscriptions have been paid.

For the next three months your Society will only exist in the open air, "roving abroad like a bird or a bee," and like the latter, we hope, treasuring honey for the coming winter meetings. We meet for the first time "out o' doors" on the third Saturday in July, at half-past two p.m., at the Eagle, Snaresbrook.

Mr. Howard, the Treasurer, read the balance sheet, from which it appeared that there was a balance in hand of £1 0s. 1d. There were, however, the quarter's current expenses still to be met; but with the subscriptions remaining unpaid, and the amount in hand, this would be covered. We understand that all those members whose subscriptions are not at once handed in, will be deprived from participating in the immediate benefits of the Society.

The following officers were re-elected for the ensuing year: The President, Vice-President, Secretary, and Treasurer.

The following were chosen the Committee: Messrs. Hannaford, Hervé, Leake, Martin, Cotton, Fitch, Simpson, and W. Clarke.

The following new members were elected: Messrs. Bailey, Simpson, Blanchard, Bunker, Neeld, Smith, Tate, Hooper. Young, Davies, Moulde, Squire.

The following were elected honorary members: Messrs. F. Hardwich, G. Rejlander, — Claudet, W. Crookes, R. Hunt, Lake Price.

On the motion of Mr. Hervé, seconded by Mr. Wall, a vote of thanks to the Chairman was carried by acclamation, and duly acknowledged.

The company then occupied themselves with the various entertainments to which we have alluded above.

Action of Carburretted Hydrogen on Nitrate of Silver.—When a current of ordinary coal gas is passed through a neutral solution of nitrate of silver, a crystalline precipitate is obtained, formed of a large quantity of little prisms, which, when dry, detonate under the action of heat, or the blow of a hammer, like fulminating silver; when it is treated with hydrochloric acid, it disengages a combustible gas, which, doubtless, is only coal gas, and contains from 78 to 84 per cent. of silver.

Photographic Notes and Queries.

PHOTOGRAPHIC COPIES OF WILLS AND OTHER DOCUMENTS.

Sir,—An interesting discussion has lately occupied the daily papers, respecting the safe custody of wills in the Prerogative Court, which shows but too plainly the necessity for some prompt and decisive action in the matter. It is not difficult to imagine the consternation that would ensue if the public were to read some morning, in the columns of the daily papers, a paragraph headed "Terrible Calamity.—Total Destruction of Doctors' Commons by Fire!" Such a casualty is by no means an improbability. The building in which the nation's wills are preserved is situated in a very dense neighbourhood: it would be in extreme jeopardy if the opposite or adjoining houses were by any accident to take fire.

Photography affords a means of at least diminishing the risk to which we are exposed by the destruction of the wills contained in Doctors' Commons, and of mitigating the evils that must arise in the event of such a calamity. These valuable documents might be copied in *fac-simile* by the process of zinco-photography, lately described in the "Photographic News." Such copies, duly verified and attested by the appointed authority, might become available for all legal purposes, in the event of the loss or destruction of the originals.

Photographic copies—obtained also by the process referred to—of wills, valuable as literary curiosities—as that of Shakespeare, for instance—might be obtained, and published for the benefit of the curious in such matters.

Members of the legal profession would do well to look to the resources presented by photography in affording, quickly and economically, *fac-similes* of important documents. For this and similar purposes it is vastly superior to any other mode of obtaining duplicates at present in use, inasmuch as they are in *fac-simile*.—Yours, &c., M. C.

ARTIFICIAL LIGHT FOR PHOTOGRAPHY.

Sir,—I was greatly pleased with your remarks on the "Magnesian Light," in No. 92 of the "Photographic News." Should the cost of the magnesian thread not be excessively heavy, I should embrace an early opportunity of experimenting with it.

I propose a method of obtaining a continuous light for photographic purposes, or otherwise, as follows:—Take a portable spring-clock; on the axle or arbor of the minute-wheel place a small barrel of light make—say brass or wood, hollow; let the magnesian thread be coiled round this, the end passing upwards through the top of the clock-case, exactly under the spirit-lamp; the thread passing up the centre of the flame of the alcohol. So soon as the wire is lighted, and begins to burn, set the clock agoing, when the supply will be constant and unremitting for hours or days. Other methods readily present themselves.

I will feel obliged if, in your number of the "Photographic News" for Saturday, you can inform me of the price of magnesian thread or wire, and where it can be got in small quantities, with such remarks as you consider will advance this light for use.

I got lately a copy of a book published by the Patent Lime Light Company, but their apparatus, as I feared, will be costly. They speak of £7 for portable apparatus, £10 for each of two bags to hold oxygen and hydrogen gas, besides machine for preparing oxygen—vastly too expensive and cumbersome for any amateur in photography.

Let us get the magnesian light, simple and easy of operation; if costly, the use can be limited. Excuse my prolixity, and believe me, yours truly, Glasguensis.

Glasgow, June 19, 1860.

[Magnesium is obtained by a process similar to that by which aluminium is procured. The price of aluminium was, until recently, 8s. per ounce; it may now be bought for 2s. 6d. or 2s. 3d. by the pound. If there was any prospect of a large demand for magnesium, it would soon become an article of commerce. At present it is only obtainable in very small quantities, and at a high price.]

The French Musical Festival.—The interest excited by the French Festival at the Crystal Palace is on the increase, and there can be no doubt that, if the weather be favourable, a large concourse of persons will welcome the Orphéonists at their opening concert next Monday. The decorations in the Palace will be on an elaborate scale. At the back of the orchestra will appear the names of the several French departments to which the societies belong, divided by large gilt eagles, surmounted by tricoloured flags. Beneath, wreaths of evergreens and flowers, and exotic shrubs, will encircle a number of busts of eminent Frenchmen. The richly-embroidered banners of the societies will be ranged in front of the orchestra, and emblematic devices will surround the organ. The *coup-d'œil* of the performance will be probably more effective than anything of the kind hitherto witnessed. The stay of the Orphéonists is limited to one week, and a committee of members of Parliament are engaged in concerting how to render their visit as agreeable as possible.

TO CORRESPONDENTS.

Chloride.—1. The jar you employed to boil the nitric acid in was unsuited for the purpose, the glaze being decomposed, and now mixed with the metal, which, while in fine powder, will be grey. Mix it with powdered charcoal and heat it in a crucible. 2. You have a copyright in your photographic productions. If any one exposes copies for sale, you can take the law upon him. Send him a lawyer's letter, to begin with.

Chaomo.—By ultramarine, we understand the pigment obtained from *lapis lazuli*, which, when compared with the pure blue of the spectrum, appears of a slightly violet hue, as cobalt appears slightly green. Artificial ultramarine cannot be brought into comparison with the pure pigment. Some specimens are very *red*, and opaque.

A Correspondent, whose signature is utterly illegible, but who dates from High Street, is recommended to use the developer prescribed by Davanne and Jouet:—Water, 12 oz.; alcohol, 5 drachms; acetic acid, 5 drachms; crystallised protosulphate of iron, 4 drachms; sulphuric acid, 1 drachm by weight, or 0·58 by measure.

O. S. W.—Books are written and journals are published for the especial benefit of those who do not know as much as yourself. If nothing was published that you are not already acquainted with, the printing press would not require to be worked by steam. But all readers do not enjoy the same privileges as yourself.

Focus.—You cannot obtain everything in a lens; something must be sacrificed. If you will have quickness, you must dispense with a large flat field, and put up with spherical aberration, which, in the case you allude to, would not be a serious defect.

H. W.—You may obtain ten gallons of pure oxygen gas in fifteen minutes, from four ounces of good chlorate of potass, and one ounce of peroxide of manganese, mixed together and placed in a retort, to which the heat of a Berzelius lamp is applied.

J. A. Smith.—You have rendered your bath alkaline; add a drop or two of dilute nitric acid, till it shows acid reaction to test-paper. We cannot recommend any particular collodion. Most dealers sell it of good quality.

A. W.—The paper was too dry when placed in the printing-frame; the presence of a small quantity of moisture is necessary to effect the chemical reaction between the nitrate and chloride of silver.

R. T.—Rain-water, boiled and filtered, will answer your purpose very well; but it would not be very difficult to procure distilled water, if you have a piece of tinned leaden pipe.

M. P. M.—The principle of construction is the same in both; the difference is only in the name. We are now using Mr. Dallmeyer's Universal Lens, and it gives entire satisfaction.

Jas. Thomas.—There is no advantage in washing your prints in salt and water. If their colour does not please you, return them to the gold-toning bath, first washing them in soft water, and watch the result carefully.

A. Z.—We cannot undertake to reply to correspondents privately; it would entail an amount of labour quite inconsistent with the discharge of our other duties.

H. A. R.—We do not find any kind of positive paper free from defects. It is best to keep to one make, as different kinds do not yield identical results.

Viator.—Your best plan would be to visit some dealer in apparatus, and state your object and wishes. He will, doubtless, be able to accommodate you.

B. B.—We cannot give any opinion as to the cause of the defect you name, but consider it is due to defective manipulation.

Hopeful.—We have a letter to this correspondent, which shall be forwarded upon his furnishing an address.

Veron.—You must choose such a cement as will not be dissolved by the solution.

Ashford, J.—You need not trouble yourself about such crotchets; if you employ a sure process, what more can you desire?

Modus.—It is certainly better to keep all your chemicals in a dark closet, and duly labelled.

F. G.—Sulphate of iron, if in bright green crystals, may be considered as pure enough for your purpose.

Alpha.—We shall give further particulars of the magnesian light as soon as practicable.

P. R. A.—We are not yet in possession of the information you require; as soon as we obtain it, it shall be published in the "Photographic News."

Innes, J.—There are disadvantages attendant upon using too small a stop. See Mr. Dallmeyer's paper, in our last number.

Omoo.—We give the preference to iodide of cadmium for sensitising negative collodion, as it is more stable than iodide of potassium or ammonium.

Hal.—Your difficulties doubtless arose from the low temperature at which you worked. If you resume operations now, you will probably succeed

Z. Z.—We should recommend you not to resort to the gold-toning and fixing bath. In inexperienced hands its results are very precarious.

Opticus.—The artisan referred to has been unfairly treated. Private interest sometimes influences public judgments.

S. P. Q.—Alcoholic collodion may answer very well in some instances. We have not, however, found it expedient to adopt it in our own practice.

W. P.—You might have spared yourself much trouble, by referring to the Indexes of the completed volumes of the "Photographic News."

D. D.—The plate is partially fogged by light striking the sensitive collodion, probably while raising the shutter of the dark slide.

Aster.—The process of Photo-zincography was described in No. 80 of the "Photographic News."

J. W. A.—Your question will be answered by an inspection of our advertising columns.

Lens.—The proper position for the diaphragm is *between* the lenses, as in the "Waterhouse stop."

Mercator.—A single achromatic meniscus lens of long focus is that best suited for copying maps.

O. R.—There is a book on photographic manipulation by Mr. Lake Price.

Carter, H.—The process has nothing to recommend it.

Amphi.—You can obtain a better result by a more direct process.

Positive and Nemo will be answered next week.

⁂ All editorial communications should be addressed to Messrs. Cassell Petter, and Galpin, La Belle Sauvage Yard, London, E.C.

THE PHOTOGRAPHIC NEWS.

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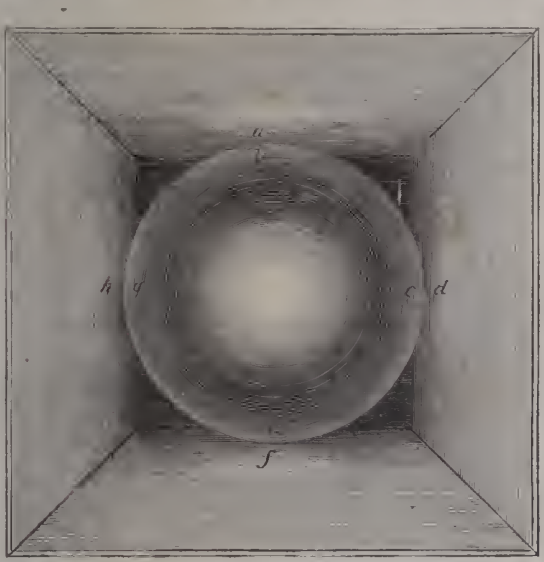
COLOUR IN ITS RELATION TO PHOTOGRAPHY.*

BY CHARLES MARTEL.

The influence of reflected colour in chiar-oscuro may be profitably studied by the photographic artist. The accompanying diagram represents a white sphere suspended in a wooden box. In the first instance, we may suppose the box to be coloured white in the inside also. If the sphere be suspended in an open space free from the influence of reflected lights, the distribution of light and shade is simple and uniform, and when once observed by the artist, can be drawn from memory. But so soon as the sphere is placed within the influence of bodies which reflect light from their surface, a complex condition of light and shade comes into play, which must be studied from the actual model, as it is too complex to be remembered, and it cannot be represented by simply observing the law of projection of shadows.



If the reflecting surfaces be white, the difficulty of representing them pictorially is comparatively trifling to what it is when they are coloured. Let us suppose the box to be coloured differently on each of its sides, and at the back; let *a* be red; *d*, blue; *f*, yellow; *h*, violet; and the back, green; the following complex reflections ensue:—the white sphere receives a reflection of red from *a*, while it reflects white light upon *a*, rendering the red weaker; it receives a reflection of blue from *f*, and reflects white light upon *f*, rendering it weaker, and so on, in like manner, with the other sides of the box. A certain space of the sphere in front will be pure white, if illuminated with white light, and that will be the only portion left white in the whole object. A painter, carefully studying this model, can make a faithful representation of it; but if it be photographed, the whole harmony of chiar-oscuro will be lost, in consequence of the chemical influence of variously-coloured rays upon the sensitive film. All the parts coloured blue and violet would come white; while the yellow, green, orange, and red, would be more or less dark, and their influence by reflection on the white sphere be entirely lost. It is easily to be conceived that if the box were illuminated by a coloured light, the complication would be still further increased. Suppose it were illuminated by an orange-coloured light, the following modifications would ensue: the violet would become redder, or lose some blue; the red would become scarlet; the orange would become more intense; the green become yellower; the light blue become grey, and the deep blue become maroon. Similar complication, although not so marked, would arise if the sphere, instead of being white, were coloured, and in a still greater degree if it were varnished or glossy.

It is worth while to pursue this subject further. In the preceding example, we have supposed the sphere to be white, placed in a box, the interior sides of which, as well as the back, are of different colours. Suppose, then, the box to be coloured of an uniform colour on each of its sides, and let it be viewed (and photographed) before the sphere is placed within it. Although each side of the box be painted uniformly of the same colour, the effect of light reflected from one surface upon another adjacent to it, and the united effect of each reflection, will cause each side of the box to exhibit a great many gradations or tones of the colour. If now the white sphere be introduced into the box, white light will be reflected on those parts of the sides which are nearest to the sphere, and coloured light from the sides of the box will be reflected on to the white surface of the sphere. But the white light reflected will not be pure, as, before it is reflected, it becomes coloured by the reflection from the sides of the box. A photograph of this arrangement, provided the box be coloured yellow, red, or brown, will exhibit the complexity of chiar-oscuro in a very complete and unexpected manner.

But this case of complexity of chiar-oscuro is surpassed by that which ensues if the sphere be coloured. Suppose the interior of the box to be coloured bright yellow, and the sphere blue. If the sphere were photographed before being placed within the box, it would give a white image; but after it is placed in the box, the yellow reflected from its sides will render certain portions of the sphere green, and the blue of the sphere reflected upon the yellow sides of the box will make them also appear green. A photograph of this arrangement will render the complications of coloured chiar-oscuro very evident.

It will now be apparent to the reader that the complications of coloured chiar-oscuro are very great, and it is important to dwell upon them, inasmuch as they are generally overlooked in photographic arrangements.

Every object reflects, in addition to its own peculiar colour, a certain quantity of white light; this is the case even with black substances. The quantity of white light reflected by the object depends upon its degree of polish.

It is often recommended that blue light should be thrown into the room where photographic portraits are taken. The philosophy of this recommendation is based on the fact that the blue rays have the greatest amount of chemical action. If all the objects to be photographed were *white*, it is probable that the blue reflection cast upon them would have an accelerating influence. But, as the objects photographed are, for the most part, coloured, the result is a *mixture* of blue rays with other coloured rays.

The colour of the flesh of most persons must be regarded as *orange*, more or less intense, and varied in hue by the greater or lesser prevalence of red. Now, the result of mixing blue with orange is to produce *black*, as in the mixture all three primary colours are found united. So far, then, as the face, hands, &c., of sitters are concerned, it may be fairly questioned whether anything is gained by illuminating them with blue light.

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* Continued from vol. iv. p. 74.

The colour of ordinary daylight is exceedingly variable. It cannot be said to be the same at any two hours during the day. It is modified by the elevation of the sun above the horizon, which exercises a vast influence upon the quality and intensity of the reflected lights; and it is modified by the greater or lesser quantity of moisture present in the atmosphere. It is generally conceded that the hours nearest to mid-day are the least favourable to photographic operations out-of-doors. This, doubtless, is due (in part, at least) to the angle at which the light from the earth's surface and from vertical objects is reflected. In taking landscapes and architectural views, the hour of the day at which the view is taken is an important element of success. As there can be no *light* in a picture without good chiar-oscuro, this element must be studied; and the artist photographer will not think it too much trouble, or a profitless task, to watch for the best aspect in the landscape he intends to take during the day previous to his operating. It is no exaggeration to say, that the landscape presents a different aspect at every succeeding hour of the day, and the aspect that should be taken will mainly depend upon the character of the scene—whether it be mild, rugged, sylvan, or cultivated. Where water forms a feature in the scene, such an hour should be chosen for its representation when the least amount of light is reflected from its surface. In an architectural subject, if the view be taken with the sun shining directly upon the front of an edifice, there will be no chiar-oscuro, no relief—only a bald, flat picture; the best time to take the view will be shortly before the sun ceases to shine directly upon the front of it. The rays striking the salient points of the structure sideways will cast shadows which, being illuminated by the light reflected from the other surfaces, will not appear opaque, but present an infinite variety of tones. Still, judgment must be exercised on such an occasion, and an effect giving an appearance of spottiness avoided.

In our own experience, most of the best pictures obtained, both portrait and landscape, were taken within an hour or two of sunset. This result is, we know, contrary to the opinion generally entertained as to the best hours for obtaining good pictures, and may possibly have been produced by local influences.

The colour of the light reflected from the sky or clouds varies throughout the day, as is well known to observers and students of nature. In early morning, blue-grey generally prevails, which continues up to nine or ten o'clock, during which time the atmosphere gradually becomes yellower, then paler, till at noon it is white; it then, as the sun declines, again becomes yellower; red gradually mingles with the yellow, till at sunset the prevailing tone of the light is orange. Previous to rain, however, more yellow rays prevail at early morn, exhibiting the sickly hue so familiar to meteorologists as a prognostic of wet weather. A remarkable fact, in connection with this phenomenon is, that the shadows of objects appear, when observed under favourable conditions, to be of the complementary colour to the dominant light. This is sometimes very evident at sunset, when, although the atmospheric light is yellow, inclining to orange, objects in shadow are suffused with a rich violet hue. These phenomena not only influence the time of exposure in photographic essays, but also the condition and quality of the chiar-oscuro of objects. And although we cannot lay down precise rules to be observed under these variable atmospheric changes, still, the photographer who studies them may turn them to profitable account in his labours.

When the sky is partially overcast with light clouds, it is lighter, photographically speaking, than when it is clear. In such conditions of the atmosphere the clouds reflect down upon the earth a large quantity of white light; they act like the white screens spoken of in the third portion of this essay. Consequently, a photographic picture can be obtained in much less time in a cloudy state of the atmosphere than when the sky is clear; other conditions remaining the same.

In connection with this subject it remains to be said, that as colours act with variable energy on the photogenic surface exposed to their influence, the result is not the same, with respect to chiar-oscuro, as when the same scene is reproduced by the skilful engraver. In obedience to certain conventional rules, the engraver has it in his power to translate *colour* by *tone;* and if Nature were arrayed in neutral tints, the photographer could do the same. But the chemical influence of light interferes with his operations, and, in many cases, mars the result, and he cannot, therefore, show himself by his works to be the artist that a knowledge of the laws of science or practical observation and experience has made him. It is not improbable, however, that some more tractable and faithful photogenic agent than iodide of silver may be made subservient to the uses of photography.

(*To be continued.*)

CELESTIAL PHOTOGRAPHY.*

The pre-eminence that England enjoys in celestial photography is mainly due to the zeal and labours of Mr. Warren De la Rue, whose report to the British Association at its last meeting excited the greatest interest among astronomers of all nations. We have this report before us in a revised state, at the moment when the approaching eclipse of the sun is directing the attention of photographers to the important subject of which it treats.

Celestial photography originated in the United States. The late Professor Bond, of Cambridge, Massachusetts, in conjunction with Messrs. Whipple and Black, was the first to take a photographic picture of any celestial body. He obtained, in 1850, a daguerreotype of the moon, by means of the great refractor at Harvard University, which has an aperture of 15 inches. The experiments were, however, discontinued in consequence of the imperfection of the clock-work, and were not resumed until 1857.

Mr. De la Rue, in 1852, obtained positive lunar photographs on collodion, in from 10 to 30 seconds; but difficulties, similar to those that led to the suspension of operations in the United States, led also to the suspension of his experiments until a driving motion could be applied to the telescope. This was done in 1857, since when, Mr. De la Rue has unremittingly followed up the subject of celestial photography. His contributions to this important branch of astronomy, at the meeting of the Association, consisted of two original negatives, which would bear considerable magnifying power; two positive enlarged copies of other negatives, eight inches in diameter, which would bear still further enlargement with a lens of low power; twelve enlarged positives of the moon in different phases, 3½ inches in diameter, among which were three showing the progress of a lunar eclipse, on February 27, 1858; enlarged positive copies of Jupiter, exhibiting his belts and satellites; lastly, a photograph of Saturn and the moon, taken together at the recent occultation of that planet, just after it had emerged from the moon's bright limb (May 8, 1859): the last-named photograph being taken in 15 seconds —a remarkably rapid result for so faint an object as Saturn.

"In 1853, Professor Phillips, aided by Mr. Bates, obtained some lunar photographs, and communicated the results of his experience to the Hull meeting of the Association. Mr. Hartnup, of Liverpool, aided by Mr. J. A. Forrest, Mr. McInnes, Mr. Crookes, and other photographers, took some good pictures of the moon in 1854. Father Secchi, at Rome, and more recently, Mr. Fry, in Mr. Howell's observatory, at Brighton, and Mr. Huggins, near London, have also produced lunar pictures. Their experiments were, in all cases, made with refracting telescopes, corrected for the visual ray. Professor Bond, in April, 1859, applied the process, with promise of a fruitful future, in measuring the distance and angle of position of double stars, and also in determining their magnitudes. He succeeded in obtaining pictures of the fixed stars down to the sixth and seventh magnitudes."

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* "Report of Celestial Photography in England," by Warren De la Rue, Esq., F.R.S., &c. &c. [From the Reports of the British Association for the Advancement of Science for 1859.] London, 1860: Taylor and Francis.

There are certain peculiar difficulties attendant upon photographing celestial objects, arising from the apparent motion of the objects. The photographic picture can never be so perfect as the optical image, with the same telescope, until we can obtain photographs of celestial objects instantaneously. If a fixed telescope be presented to a celestial object, the star will, in consequence of the earth's rotation, course along the field of the telescope, in a line parallel to the earth's equator; the image obtained is therefore a streak, representing the path of the star. We might suppose that this streak would, for short distances, appear straight and continuous; but it is broken up and distorted, and consists of a great number of undulating points, crowded in some places, and scattered in others. This distortion arises from disturbances in our atmosphere, which cause the star to flicker.

If the telescope be mounted so as to follow the star's apparent path, the picture obtained after some seconds' exposure, is not one single clear disc or point, but a conglomeration of points extending over a greater or less area, according as the atmosphere has, during the interval, produced more or less flickering.

The reflecting telescope has considerable advantages over the refracting telescope for celestial photography, on account of all the rays coming to a focus in the same plane; hence, the focus having been adjusted for the luminous image, it is correct for the chemical image also. Refracting telescopes can, however, be specially corrected for the chemical focus, in the same way as camera lenses.

The acme of perfection in lunar photography would result from the employment of Lord Rosse's large telescope. The size of the pictures of the moon taken by Mr. De la Rue is about $1\frac{1}{10}$ inches in diameter; these might be enlarged by means of an adaptation of the solar camera; impressions 8 inches in diameter have already been obtained in this manner; and if the lenses lately produced by Mr. Dallmeyer be employed, still greater enlargement might be obtained without any sensible distortion.

It will surprise many of our readers to learn that, although we have a full moon every month, a full moon is never visible to us, except just before or just after a lunar eclipse, or, at all events, except when the sun, earth, and moon are very nearly in the same plane; at all other periods of the full moon, we are unfavourably situated for seeing the whole of the illuminated hemisphere. This phenomenon, and that of the different apparent diameter of the moon at various times, dependent on her distance from the earth, comes out prominently in a collection of lunar photographs. At the moon's mean distance, the pictures taken with Mr. De la Rue's reflector measure 1·0137 inches, the variation being from 1·0053 to 1·1718 inches.

Stereoscopic pictures of the moon are obtained by combining two views taken at sufficiently distant periods. The light and shade in the photograph do not, in all cases, correspond with the light and shade in the optical picture. The reason is, that portions of the moon equally bright, optically, are by no means equally bright, chemically. Frequently, details are rendered visible photographically, which escape observation optically, and this fact is full of promise for future selenological researches. By the aid of photography we may reasonably hope to obtain a more perfect map of the moon than now exists. The mass of curious details already displayed by photography is quite overwhelming. The relative actinic power and luminosity in the planets is remarkable. In the occultation of Jupiter by the moon, on November 8, 1856, Jupiter appeared of a pale-greenish tinge, apparently of about one-third of the general brilliancy of the moon; but the actinic power of Jupiter's light was subsequently found to be equal fully four-sixths or five-sixths that of the moon. Saturn required twelve times as long as Jupiter to produce a photograph of equal intensity on an occasion especially favourable for making the experiment.

Stereoscopic pictures of the larger planets may be obtained by allowing a sufficient interval of time to elapse between the taking of the two pictures. In the space of 26 minutes Jupiter will have rotated through the 15° 48′ necessary to produce the greatest stereoscopic effect. In 69 minutes, Mars would have rotated through the same angle, and as his markings are very distinct, we may hope to obtain stereoscopic views of that planet. The markings on the other planets are too faint to hold out a promise of similar results.

In concluding the first part of his report, Mr. De la Rue takes occasion to remark that photographing the moon is a laborious undertaking, affording full occupation for one observer, who must pay unremitting attention to the condition of the various chemicals employed, so as always to be prepared for a fine night with such as will work. He, therefore, strongly urges the claims of this new branch of astronomical science to a more extended cultivation than it has hitherto received, with the conviction that it will require the ardent co-operation of many astronomers to develop fully its rich resources.

(*To be continued.*)

ACTINOMETRY.

BY M. GAUDIN.

Among the various branches of human industry, agriculture holds the first rank; consequently, everything connected with it has a claim upon our attention.

Vegetables require for their perfect development the combination of many well-known agents, such as moisture, heat, and especially light. Without each of these vegetation is impossible.

Instruments which indicate with precision the temperature of the air, and its degree of humidity, have long been in use; such are the thermometer and the hygrometer, to which may be added, the pluviometer, which measures the amount of rain-fall during one or more days. Two, therefore, of the agents necessary to vegetable life—heat and moisture—are duly measured and recorded; as for the third, the actinometer is nowhere to be seen.

This is accounted for by the fact, that photography has had but a twenty years' existence, and it has not hitherto been possible to construct an actinometer that would compare in precision with the hygrometer or the thermometer; but the time has arrived when we should think seriously of supplying this deficiency, otherwise meteorological tables will exhibit a humiliating imperfection.

Many years ago my attention was directed to this subject, and I pointed out the means of obtaining comparative results from different countries. This year my attention has been again attracted to the subject, in consequence of the unusual character of the weather. For more than a month, the wind has constantly blown from the south, and completely neutralised the sun's power. It is true, that the indications of the thermometer can, up to a certain point, prove, by the depression of the mean temperature, that the heat has diminished in the same ratio; if the temperature of the summer has been that of the mean of the month of April, we may suppose that light has been equally deficient; but, instead of this conjecture, it would be very desirable to have positive data.

In fact, solar light has been almost completely wanting. Never before have I observed, at this season of the year, such a persistence of cloudy sky; and this deficiency will, doubtless, make itself severely felt in the deterioration of the harvests.

I had already noticed this effect in my garden. On most parts of it the sun has never shone; in these parts, the plants have produced neither fruits nor flowers. On the other parts, the flowering and the fructification, for the same kinds, has been more or less according to the proportion of direct solar light they have received; but this year all the stalks are slender, and without the least doubt this effect is general in the fields.

Thus, up to the present time, on account of the extraordinary deficiency of solar light during the last month, the stems of most plants will have grown slender and thin. With hay, the damage will be inconsiderable. There will be the usual quantity, for the length of the grass will compensate for its thinness; but for the cereals, the length of the stalk renders it so weak, as to be easily blown down, and necessarily produce a deficiency in the grain; this is an evil without precedent.

For the vine, especially after a late spring, this check will greatly compromise the vintage on account of the strictly limited time that remains for the grapes to mature before the setting-in of frost.

Solar light is, doubtless, the prime mover of vegetation; in striking directly upon the leaves of a plant, the sun excites the circulation of the sap, producing transformations in every part of the vegetable, however great or small it may be. If the sky coutiuues cloudy throughout the whole day, we may boldly assert that, by this fact alone, its growth will be diminished one-half; so that during the month the sky has continued cloudy, vegetation has been retarded at least fifteen days, together with a weakness of constitution inseparable from a deficiency of light, which may be compared to a deficieucy of nourishment among animals.

The iudications of the actinometer—although very different from those of the hygrometer and thermometer, which are not cumulative—are of the same nature as those of the pluviometer, which always gives the total; only the actinometer should be examined day by day, for greater convenience, and to show the phases of its increase and decrease from day to day.

According to my experiments, the indications of this instrument will vary from a minimum of a year to its maximum, from unity to 1,000 for a single moment, and from unity to 2,000 for a whole day, in comparing a thick foggy day at the end of December, with a sunny day at the end of June.

In adopting this unit of December, we shall have, it appears to me, a convenient scale, the more so, inasmuch as we shall always be obliged to make the dark days of December figure with the bright days of June.

It remains to speak of the means of putting it into practice. We immediately recognise that we have not yet the means of directly measuring the luminous impressions which vary in the actinometer from 1 to 2,000; still, to obtain the actinic power of each day, the actinometer must be in action during the whole day. The following method has occurred to me for removing the difficulty:—

I have already said, that the conditions of an actinometer will be found to consist in having a circular opening cut in a metallic plate placed in a vertical position towards the north, placing the photogenic substance opposite to it at a suitable distance, covered with a screen pierced with a circular opening. Let us suppose the opening of the external metallic plate, varying in its dimensions at pleasure, and the photogenic substance placed at the distance of a mètre from the front of a camera obscura, it will suffice, in order to make the enormous disproportiou of the extreme diurnal effects employed disappear, to have openings of various diameters, as will be described. For example, in December, we should work with an aperture of 10 centimètres, letting 100 times more light pass during the same time than one of 1 centimètre, on account of the greater extent of its surface; while, in the month of June, we should work with an aperture of half a centimètre, representing one-fourth of the surface. If, on comparing the December day with the diaphragm 10, with the June day with the half diaphragm, we find the June effect four times as intense, the relation of the apertures employed will be as $\frac{1}{4}$ is to 100, or as 1 is to 400; and notwithstanding that the intensities will be found as 4 is to unity, it necessarily results that the actinic power of the days compared will be as 1 is to 1,600.

In working systematically, as follows:—

	THE DIAPHRAGM WILL BE
In December	10
January	8
February	6
March	4
April	2
May	1
June	0½
July	1
August	2
September	4
October	6
November	8

We can reduce the observations in the study subsequently.

I proposed, on a former occasion, to employ sensitised paper, but I am aware of the imperfection of that means. Since then, some authors have proposed the combination of chlorine and hydrogen, under the influence of diffused light, in the construction of an actinometer. If the quantity of hydrochloric gas thus produced were in proportion to the actinic power to which the mixture is submitted, the result would be a very distinct means of measuring the luminous effect in the reduction of the volume. This method deserves to be studied under this relation, for in the natural state it has no chance of success. We must first discover a liquid obstructor, which does not absorb chlorine in the absence of light.

Water cannot, on that account, be thought of, nor mercury either, but we shall doubtless find a suitable liquid.

With an actinometer established on this priuciple, we must always operate with diffused light from the north, passing through a shutter with an aperture varying with the season. Thus, with a slight improvement of the means, we may have an instrument capable of measuring the actinic power received every day by vegetation, a power which for them is absolutely the same as that which results from the quantity of combustible employed; the more carbon there is burnt, the greater the quantity of mechanical effect produced; by analogy, the more actinic power a day, the more activity there will be in vegetable life.

SCIENTIFIC GOSSIP.

A very ingenious application of gun-cotton has recently been proposed by M. Boettger, of Frankfort. One of the operations which is very frequently performed iu a photographic or chemical laboratory, is the filtration of corrosive liquids, for the purpose either of separating from them some desired crystals or precipitate, or of removing from the liquid suspended impurity of any kind. Pounded glass, rock-crystal, or fine asbestos, are the substances most frequently employed for this purpose; but owing to the nature of these bodies, they do not accomplish the purpose as satisfactorily as might be desired. M. Boettger employs for the filtration of such liquids a glass funnel, the neck of which is loosely plugged with gun-cotton. This substance, when properly prepared, has just the proper fibrous, porous texture for an efficient filter; and being a product of the action of the most corrosive agents—viz., mixed nitric and sulphuric acids—is scarcely attacked, in the slightest degree, at medium temperatures, by any single agent or solvent hitherto tried, except acetic ether. Gun-cotton may thus be employed for filtering strong nitric acid, fuming oil of vitriol, permanganate of potash, strong caustic potash, or *aqua regia*; and even crystallised chromic acid may be separated from its mother-liquor by this filter. Its use in drying crystals which have been deposited from corrosive liquids is obvious. It must be borne in mind by those of our readers who may desire to avail themselves of this valuable discovery, that the gun-cotton ordinarily used by them will not be applicable for this purpose, as it is prepared in comparatively weak acids, and is capable of being dissolved by a variety of agents. True, gun-cotton, of the most explosive character, is the kind to employ—such as is obtained by acting upon cotton with the strongest acid.

Our correspondent, "F. C. S.," some of whose remarks we gave in last week's "Gossip," has made the suggestion, that it would become an interesting topic of discussion for some of our scientific readers, as to what becomes of the photographic rays which, emanating from the sun, are constantly impinging upon the orange-glass window panes of our photographic laboratories, but, being unable to penetrate this coloured diaphragm, must of necessity either be diverted, quiescently absorbed, or compelled to appear as a new manifestation of force. There will be doubtless many other and somewhat analogous subjects of inquiry, which will suggest themselves to the consideration of those of our readers who feel interested in what may be termed the physics of photography. We have reason to believe that "F. C. S." has for some time past been experimenting rather assiduously on this subject, and we hope, in a short time, to be in a position to lay before our readers some of the more important conclusions which he has arrived at, on the general subject of colour.

It has often struck us as a matter for astonishment, that accidents from fire do not oftener occur in photographic rooms, for there are more explosive or combustible bodies used in our art than in almost any other. First of all, there is the gun-cotton; then alcohol and ether, the latter of which, when volatilised into the air, is as explosive, and far more dangerous than gun-cotton. Then there are the goodly array of varnishes, either of which would serve to set fire to a house if the bottle containing it were accidentally broken near a flame. We have recently heard of another kind of accident which will increase the known risks to which a photographer is liable. An operator had been in the habit of using a plate-holder for many years, and, as we all know, the constant drainings from the plates had saturated the wood-work with nitrate of silver. In course of time, the fastenings of the corners gave way, and as the frame was wanted in a hurry, he bethought himself of cementing it together with gum shellac. The melted gum was applied to the edges to be joined, and as they were not quite hot enough to adhere, he incautiously put the corners close to the flame of a spirit lamp. Instantly the whole frame was in a blaze, and it burned so rapidly, with a fierce, spluttering, hissing sound, that had he not had a pail of water at hand, wherein he immediately plunged it, the whole frame would have been consumed; as it was, the lower part was reduced to ashes. This must be a warning to some of our "Amateur Mechanics" to be careful ere they introduce the corner of an old silver-saturated plate-holder into the flame of a lamp.

ON THE PREPARATION OF POSITIVE PAPER.

BY M. ALEO.

1. *Preparation of the Albumen.*—Break the eggs into a graduated measure, carefully avoiding the mixture of yolk with the whites, and when the desired quantity of albumen is obtained, separate the germs, and pour the whites into a glazed earthen vessel, and to every 100 parts add 5 parts of a soluble chloride (that of ammonium is best), first dissolving it in as little water as possible. The quantity of water must not exceed one-tenth of the albumen, if a very brilliant surface on the proofs is desired. Beat the whites into a froth, and, after allowing it to settle for five minutes, remove the froth with a fork into a hair sieve, or muslin strainer, placed over a second vessel. This operation to be continued until the whole of the whites are beaten into a froth and strained.

Allow the filtered albumen to settle for twelve hours; it is then ready for use. Draw sufficient quantity off into a shallow glass or porcelain dish, without disturbing the sediment. It is a good precaution to strain it through a piece of fine sponge placed in the neck of a glass or porcelain funnel. When circumstances permit, it is best to allow the albumen to repose four or five days before use. It appears to clarify itself, and gives a more brilliant surface to the positive paper.

2. *Preparation of the Paper.*—The positive paper must be carefully selected, and experimented upon, before the preparation of a large quantity is undertaken. If it be unequally sized, it will give uneven proofs and unsatisfactory results. Even the cutting of the paper to the required size demands much care, and only one sheet should be cut at a time, with an ivory paper-knife, without pressure or creasing.

Mark the back of the paper, and place it, sheet by sheet, carefully on the albumen, without allowing the liquid to flow on to the back of the paper. This operation is best performed in damp weather, for then the albumen takes to the paper more readily, without forming bubbles, and the paper also dries more slowly and evenly. The first sheet floated is almost always defective.

Some little dexterity is required in floating the paper on the albumen; the description of which is difficult, and necessarily unsatisfactory.

The time which the paper should be allowed to float upon the albumen will vary with the thickness and sizing of the paper: two minutes and a half may be taken as the average. It must not be reversed until it lies flat on the surface of the liquid. When this ensues, take the sheet by the two most distant corners, which, before it was floated on the albumen, have been previously folded back, and raise it slowly and regularly, so that the albumen forms a continuous, even coating over the whole surface. If the paper be raised too quickly, the albumen will flow down the paper in streaks, and the surface will dry uneven. By taking the paper at the corners most distant from each other, and suspending it to drain and dry in that position, the risk of drying unevenly is avoided.

3. *Hanging and Drying the Paper.*—The manner of hanging and drying the paper is one of the most important points, to avoid unevenness. The following method has always been successful, without causing any embarrassment to the operator:—Take two pieces of stout whipcord, and wax them, to prevent any fragments falling on to the wet paper; and string on each pieces of thin cork, of about an inch or an inch-and-half square, with holes pierced in the centre, through which the cord can freely pass. The cords are fastened to two walls, parallel to each other, with three bars of wood placed at equal distances along the cords to keep them apart; the distance must be a little greater than the width of the albumenised paper. Through each piece of cork a black-varnished pin must be passed upwards in a slanting direction, which penetrates the corners of the paper without difficulty. Care must be taken that the paper hangs fully distended and even, for, if it becomes curved, the albumen will dry upon its surface unequally, and spoil the proofs taken upon it. According to the extent of the operations, so may these suspending appliances be multiplied; they have the advantage of taking up but little room, and are easily removed when the operation is over. The albumen that drains from the paper can be collected in dishes, or on sheets of waste paper spread on the floor.

PERSISTENT ACTIVITY OF LIGHT.

Since M. Nièpce de Saint Victor announced his supposed discovery, that light could be preserved for any length of time, and made available for photographic purposes when required, much ingenuity has been exercised in the endeavour to account for this singular and unexpected phenomenon on a rational basis.

Various experimentalists have, as they consider, conclusively negatived M. Nièpce's conclusions. It has been shown, on the one hand, that the effects adduced as evidence of stored-up light can be produced without the agency of light at all. But M. Nièpce, nothing daunted, has returned to the charge, and lately brought forward the following experiment in support of his views:—

In the presence of certain eminent *savants*, he opened a large tin tube, which had been hermetically closed against all external influences, change of temperature excepted, by being carefully soldered. Within was a sheet of paper rolled up, which had been prepared with tartaric acid, and exposed to the sun's rays, nearly a year previously, and immediately inclosed in the tube. On throwing some nitrate of silver on the paper it immediately blackened, exactly as it would have done had it been exposed to a strong light. It seems impossible not to attribute this instantaneous action to the persistent action of the light absorbed a year previously by paper soaked in a solution of tartaric acid. If this experiment succeeded better than a similar one attempted recently, it was evidently owing to the tube being more perfectly closed; and what took place after the lapse of a year, will certainly happen after the lapse of five or ten years.

Mr. Busk, whose experiments were recently recorded in this journal, established the following fact:—A sheet of paper is immersed in a diluted organic or inorganic acid judiciously chosen—acetic or tartaric acid, for example. When dried, it is sensitised in a bath of nitrate of silver and dried again; then put in contact with a design which it is intended to copy, for half an hour or more; the paper is next exposed to the sun's rays for half an hour, and a negative picture makes its appearance, which is fixed by being washed in ordinary water. It is not even necessary that the exposure to light should take place immediately: the paper placed in contact with the original design, may be kept several days between two sheets of white paper, without losing the property of revealing the latent image under the influence of the sun's rays. A circumstance more difficult to explain, is that the original design does not require to be previously solarised, or exposed to light.

M. Thenard endeavours to explain away the conclusions derived from these facts, by the following experiment communicated by him to the Philomathic Society:—

1. In the dark, a sheet of ordinary paper was desolarised by exposing it to the steam of water during an hour.

2. The sheet of paper, so treated, was divided into two parts; one was put aside to serve as a comparison, the other was rolled up, and placed in a glass tube, and ozonised oxygen passed in at one end; at the expiration of a quarter of an hour, the ozonised oxygen was perceptible at the other extremity; the paper was then withdrawn.

3. This same sheet, employed in the same manner as the solarised papers of M. Nièpce de Saint Victor, produced the same effect; the other piece of paper, kept as a comparison, produced no effect.

4. A nitrate or chloride of silver paper, treated by ozone, on the contrary, gave no apparent result.

5. Ordinary paper, when ozonised, presented in every respect the properties of solarised papers.

6. Ozonised paper, kept for some time in a test-tube, disengaged an odour which was not ozone, but of an essence or essential matter.

"What," asks M. Thenard, "shall we conclude from this?" But that the phenomena of solarisation, described by M. Nièpce, are chemical phenomena, directly determined by light, which acts only as an intermediate agent.

The Photographic Tourist.

A TOUR ON THE BORDERS OF DEVON AND CORNWALL.

Having determined to start from Exeter, on a photographic trip to the borders of Devon and Cornwall, I now forward you an account of the same; and I can assure photographers, amateur and professional, that the byways, nooks, and corners of the two counties present an almost unlimited amount of interesting and artistic "bits;" while, in some instances, the subjects are not to be equalled in the kingdom.

Before starting, I had a look round Exeter, which seems to be a sort of "hotbed" of photography, as there are about a dozen "professors," of various "shades of merit," in and about the High Street. Even hairdressers join "likenesses taken for sixpence" with hair-cutting for twopence, or a "clean shave" and your "image" for sevenpence—cheap astonishment for the imagination. The principal object in this "Dunmoni," or "City of the Red Earth," is, of course, the Cathedral. The "entrance front" is a good subject, and plenty of room for the camera. By-the-bye, the said front would be much improved for photographing, if the Dean and Chapter would allow a fire-engine to play against it for a few hours, to soften and wash away the dust of the last hundred years.

The inside of the Cathedral, from the west door to the organ-screen, is a fine subject. I obtained permission to look over the Bishop's Palace, where the unfortunate King Charles and his Queen Henrietta spent some of their troubled time. The east end of the Cathedral, from the Palace garden, is splendid in the extreme; and the large window of the Chapter-house, and side and front of the Palace itself, are all well worthy of notice. The carved chimney-pieces in the hall and library are also capitally adapted for the "pencil of light."

In the city itself, the Guildhall in the High Street is a fine bit, and photographs well. The best general view of the city is to be obtained from a field at the back of St. Thomas's Workhouse.

As I passed the Church of St. Thomas, I perceived the door open, and the old cleaner going in, so I followed her, and had a most agreeable surprise, for on the left hand of the altar lies a sleeping figure, carved in white marble—a most exquisite work. On inquiry, I found it was the production of the sculptor Bacon, representing his favourite daughter, who was the wife of a former clergyman of the parish, now a colonial bishop. After her death, the father (long retired from his profession) had a block of marble placed in an apartment near the church, and here, from memory, and love for his departed child, executed the fine monument I saw before me. The cleaning-woman, observing the interest with which I viewed the chipped marble, and in reply to "Did you know the lady?" said, "Oh, yes, sir, well. She was a dear, kind lady to me, and lies there just as if asleep." It would make a good subject for the stereoscope.

I now proceeded, with bag and baggage, to the Red Cow village, and took the train for Crediton, eight miles from Exeter; here I found "good entertainment for man and horse" in abundance, and a pleasing variety of inns, hotels, and public-houses. As it was late when I got in, and came on to rain, I made myself comfortable for the night at the Seven Stars, having selected that "hostelrie" in preference to the Half Moon, which looked ruinous, and much on the wane. After a good night's rest, I was up early, and out "photo-snatching," or looking out for subjects; the first place I went to was the church, where I found a noble west window, which, with some good carved work inside, and the remains of the old Bible chained to the reading-desk, makes a fine bit, and stands in a good light. The church itself is of great length, having formerly been the cathedral of the diocese, before the see was removed to Exeter. I now took my way to Shobrooke Park, a distance of about a mile, and got a splendid view of the mansion, which stands out clear and bold, with fine groups of elm and beech to the right and left; the ornamental water, island, &c., makes another very good subject. A fine view of Crediton itself may be got from the high ground at the back of Downes; while Heywood's Almshouses, and the New Grammar School, are good subjects, and in good position for taking.

I now packed up, took my way to the railway station, and went on to Eggsford; here I found a capital inn, and stopped for the night. I was off to work the first thing in the morning, and found Eggsford House, the seat of Earl Portsmouth, admirably adapted for a picture, stereoscopic or otherwise; while the gamekeeper's lodge, and the old church, with the magnificent cluster of trees, and fine sweep of green sward, afforded several good and effective pictures. It was now getting on for the afternoon, when I fortunately got the chance of a cart for Taw Bridge, where I left the things, and walked on two miles, to the Egremont Arms, at Bondleigh, to which place I had been directed by a photographic friend at Exeter.

On arriving at the said "Arms," I found it far from handsome; a small, unpretending building, backed by the church, and flanked by an old farm. On entering the kitchen, I was very civilly received by the landlady, who, I afterwards found, had formerly been cook to the great Exeter Rothschild of the cabbage garden—old Brunskill the tailor—who died a few years back, worth above £100,000. The landlord now made his appearance, and in his peculiar countenance and age, with a very rough head of hair, for the first time in my life, I saw a living realisation, wanting only the dress, of the "Dougal creature." On telling him I had been recommended to his house by Mr. ——, "Oh! ha! I knows," said he; "old Shakes, as we used to call him, as took map o' the church, and parson's horse, and the old bridge, and lots of places about here. I used to go with him to carry the *crammer*—as he called it—an old box wi' a glass eye. I know two or three places about here that he used to call fine bits; but he used to take lots of places about here with a pencil on bits of paper—he used to *scrat* 'em down as fast as I could talk. I heard our doctor say as he was a first-rate hand at scrating."

On further inquiry, I found my friend, the sketcher, used to send my Dougal-looking host to North Tawton, about two miles off, for bread, tea, sugar, and butter, as the calls at the Egremont Arms were so few and far between, that the victualling-office was in a state of emptiness. So I followed suit, and sent for a supply, at the same time engaging the landlord's services to carry the *crammer*, as he used to do for the sketcher. In about half-an-hour the commissary returned, when I made a good meal, nicely prepared in a homely way by his wife and a sharp little red-haired girl of eleven or twelve years of age. We soon got into familiar conversation, when I found my host possessed a more than usual amount of shrewdness. He told me the steward of some of the gentlemen that came there said his little girl had a good voice; he wished me to hear her sing, but no inducement could get her to the warbling point. On retiring for the night, and after I had been a short time in bed, her diffidence had left her, and no stranger being present, she began to sing; and for a child of her age, I heard one of the strongest and finest voices that can possibly be imagined. On saying, in the morning, that I thought it was a pity she was not properly instructed, they told me the sketcher had said the child was a sure ten pounds a-week, if properly worked; and I am inclined to think my friend of the black lead was right.

After breakfast, I started with the landlord to the Taw Bridge Inn, where I had left the things, and found the Taw Bridge itself, which stands close by, a remarkably good subject. It is a fine old timbering bridge (as they call all wooden ones) on ivy-covered arches—a good bank at a convenient distance for the camera. On focussing for a view from a capital point, I expressed my regret at a straggling, intrusive bit of bramble that hung down from the side rail of the bridge, and crossed the fine curve of the arch. "Oh!" says my guide, "when the old mapping chap seed anything of that sort as he did not like, he took a big, sharp, hooky knife out of his pocket, and tied it on a long stick, and chopped the *disagribbles*, as he called 'em, down; and then he'd allus a lot of thick string in his pocket with a hook to the end, that he pitched over the bough of a tree as he didn't like, and pulled it out of the way; and I used to hold it fast till he'd had a shot at 'em with his *crammer!*"

Now these are capital hints for photographers:—First, to always have a good sharp gardener's pruning-knife to tie to the end of a stick, to chop away "disagreeables" in the shape of brambles, small branches, weeds, &c., that often interfere with the clearness and beauty of a picture; and in the second place, a quantity of strong cord, or thick string, to form a photographic lasso, to put aside intrusive boughs and objectionable branches of trees.

We now went up to the little church at the back of Brushford Barton, where I had unmistakable evidence of the presence of "disagreeables." As the view now stands, a good cottage on the left is spoilt by an old scrubby bough or two, and the tower of the church hid by an old tree; remove these, and you will have an ivy-bound cottage, small gateway, and fine old elm tree on the left, a quaint, old-fashioned, penthouse-roofed tower, and fine old west window and door, with two majestic elms and wooden gateway, with dwarf-stone wall, and any clear distance from one to a hundred yards. Finding the view, as it stood, photographically worthless, I retraced my steps, with my *crammer* bearer, to Taw Mill, and here I found a subject worth any amount of trouble to secure. A fine, old-fashioned water mill, the side formed of irregular feather-edged boards, two dwarf, old-fashioned gables, a large water shoot, and two splendid wheels; on the right is a fine old gate and bars, while the left corner is well balanced by a projecting clump of ash and brushwood. It makes an admirable picture. My Sancho said that "the old pictur chap as cumd to map it off said it wur worth a Jew's eye;" at the same time giving me a wonderfully knowing glance with his own Dougal-looking optics.

After taking the mill from two points, we crossed to the Taw Marsh, where I found a fine bit reminding me strongly of some of the best effects in Constable's landscapes. Here I found the advantage of the pocket "reaping-hook" and home-made "lasso." After chopping away sundry loose and objectionable brambles, and tying back two overlapping branches that interfered with the right-hand top of my sky, I got a rough wooden bridge and low bars on my left, with a fine old withered stump in the extreme corner; to the right, a low range of brushwood; a fine flat middle distance, with dwarf copse on right and cluster of oaks to the left; while nearly in the centre of the picture, from the wood in the extreme distance, rose—clear and distinct against the evening sky—the fine old tower of Bondleigh Church. We now unstrung the boughs of the old tree, and went down the lane to Bondleigh Bridge, which makes a very good picture either from the right or left. I now returned to the Egremont Arms, perfectly satisfied with the events of the day. Here I passed another pleasant evening with my eccentric host and his good-natured wife, and the little red-haired girl with the fine voice. We had no interruption the whole evening, for I found the Egremont Arms—like Dennis Brulgruddery's Red Cow on Muckslush-heath—rarely troubled with customers.

In the morning, I was up betimes, and, with the assistance of the landlord, carried the things over to North Tawton. On arriving there, I found the omnibus did not go to Hatherleigh before the following day. So, redirecting the baggage, and ordering it to be sent on the following day, I took leave of my Dougal-looking friend, and had a stroll through the town. Finding nothing in North Tawton to take my attention, I walked on two miles, to Sampford Courtenay; here a good view may be obtained of a fine old church. I now passed on to Jacobstow, a small place, about three miles from Hatherleigh, and put up at the Swan Inn, where the sketcher before mentioned used to stop, and where I arranged to pass the night.

(*To be continued.*) J. G. F.

Dictionary of Photography.

Oxalate of Silver.—A combination of oxide of silver with oxalic acid. It is in the form of a white powder, which is soluble in nitric acid, but insoluble in water. It becomes blackened upon exposure to light. As oxalic acid sometimes results from the partial decomposition of collodion, oxalate of silver is formed in the sensitising bath.

Oxymel.—A mixture of honey and acetic acid, much used in pharmacy in cough medicines. It was introduced into photography as a preservative agent for sensitised collodioned plates, and has enjoyed considerable popularity. It has had so many rivals, however, that it has now to share its popularity with raspberry syrup, infusion of malt (sweet wort), and sago.

Ozone.—According to M. Schoenbein, there are two kinds of oxygen gas, the one being negative active oxygen, or *ozone;* the other positive active oxygen, or *antozone*, which, by their combination, produce ordinary oxygen. The decomposition of oxygen into positive and negative oxygen he designates by the name of *chemical polarisation of oxygen*. He endeavours to prove that oxygen is polarised during slow combustion, in electrolysis, and generally in those circumstances which cause the production of ozone. His views, however, are not adopted by chemists. Whatever it be, ozone exhibits certain properties not possessed by ordinary oxygen. It has a peculiar metallic odour; it liberates iodine from iodide of potassium.

Ozone may be readily obtained by decomposing peroxide of barium by sulphuric acid. Oxygen very rich in ozone is given off. During the slow combustion of ether and of phosphorus, ozone accompanied with oxygenised water is formed. The product of the slow combustion of ether indicates both the presence of oxygenised water and of ozoned ethyline. It immediately reddens blue litmus paper, and turns iodised starch paper blue.

Ozone is formed when a current of air is passed over a platinum wire rendered incandescent by an electric current; its presence can be ascertained by its peculiar smell, and by its action on iodised starch paper.

The presence of ozone in the atmosphere is supposed to exercise a marked influence on its salubrity. At present the whole subject of ozone appears to be too imperfectly investigated to admit of our forming finite notions upon its nature and properties.

Palladium.—A brilliant metal, intermediate in colour between silver and platinum. Its density is 11·8. It melts in the strongest heat of a forge, and in the flame of the oxyhydrogen blowpipe. It is ductile and malleable. It does not combine directly with oxygen, but may be oxidised by indirect means. Protochloride of platinum has been employed for darkening negatives, but it appears to be only a colouring; the image is not intensified.

Paper.—Good paper is composed solely of vegetable fibres, such as cotton and linen; it is nearly pure cellulose. As paper forms a valuable photographic agent, and is the recipient of the photographic image, it is an important consideration in its manufacture to obtain it in the greatest state of purity, as free as possible from metallic fragments, and of perfectly homogeneous texture. It must be strongly sized, so as to admit of its resisting the prolonged action of the various baths to which it is submitted.

The "sizing" of photographic paper greatly influences the photographic results obtained upon it. French paper is sized with starch and resin, and is alkaline. English paper is sized with gelatine and alum, and is acid. French paper is preferred by some for positives, and English paper for negatives.

Paste.—The selection of a good material for mounting positive proofs on cardboard, &c., is a matter of some importance, inasmuch as it involves the durability of the picture. Nothing seems better adapted for the purpose than newly-prepared starch of the consistence of cream. It becomes sour if kept too long, and is then unfit for use.

Pendulum.—In the absence of a watch or clock, time may be measured by a pendulum vibrating seconds. The length of such a pendulum is about 39 inches, and it may be extemporised by a plumb-line of that length swinging freely in space.

Pentasulphide of Potassium.—Familiarly known as *liver of sulphur;* sometimes also called polysulphide of potassium. It is a compound of five equivalents of sulphur united to one equivalent of potassium. It is employed in photography, being added to waste solutions containing silver, to convert the silver into sulphide of that metal.

(*To be continued.*)

The Amateur Mechanic.

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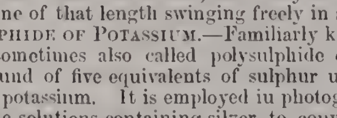
PAPER—(*concluded*).

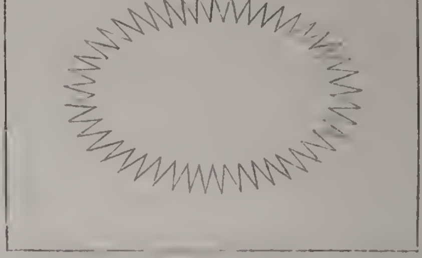
In making articles of paper, it is necessary, in most cases, to have a block or mould the shape and size of the object required, on which the paper must be worked, as we described in making the cap for a lens, in our last. Covers for nitrate of silver baths, for jars of various kinds, are easily made by this method, and may, as in the cap referred to, be modelled on the bath or jar itself.

Dishes or trays may be made of cardboard, very simply, and will answer for many purposes, such as developing-trays, perfectly well. The best plan is to proceed as follows:—Procure a piece of cardboard, about an inch and a half larger each way than the developing-tray required, and having measured accurately the size required for the bottom of the tray, and marked it out with a pencil in the centre of the card, cut away pieces, about three-quarters of an inch square, from each corner, or, what is perhaps better, from three corners, and a lozenge-shaped piece from the fourth, so that, when the dish is complete, this corner may form a lip to pour from. The shape of the piece of card will be like the diagram.



Along the space from corner to corner, indicated by dotted lines, make a slight cut with a penknife, so as to partially divide the card: this will render it easy to turn up the edges, so as to form the sides of the dish. These must now be secured in their position, by means of strips of glued paper; the partially cut portion of the card should also be strengthened by covering with strips of glued paper. When the glue is quite set and firm, the tray may be varnished inside and out with a solution of gutta percha in benzole, or what will perhaps answer the purpose better, and will certainly be more manageable, a strong lac varnish. This will soak into the cardboard, on the first application, but should be repeated three or four times, until a well-varnished and waterproof surface is obtained. The application of the varnish, more especially the last coat, should be effected near a fire, in order to secure a hard, glossy surface; all spirit varnishes being apt to dry dull, dead, and powdery, if applied without heat.

Another useful application of paper, or rather of cardboard, is to the production of a contrivance for vignetting positives on glass with greater ease, and decidedly better effect, than by the use of the ordinary vignetting-glasses sold for the purpose. A piece of cardboard, about sixteen inches by twelve, is required; in the centre of this an oval aperture, about six inches in length, is to be cut with serrated edges, the teeth being about an inch in length. The shape is shown in the diagram:—



This is placed in an upright position, immediately in front of the lens, at a distance of about twelve inches, varying, of course, with the focus of the lens, and the proportion of the figure required to be shown in the picture; it must never, however, be so far removed from the lens as to bring the teeth of the oval into the slightest approximation to sharpness. With the sitter at any distance from six to twelve feet from the lens, the vignetting-screen may be as much as eighteen inches from the lens, without producing any other effect than the soft breaking of the figure into the background. The softness is sometimes increased if the regular line of the teeth be interrupted by turning each alternate one in an opposite direction, giving them a little "set," like the teeth of a saw. The card may be of any colour, depending on the effect desired: it is a good plan to have one side white, and the other a dark grey. A very pleasing effect is produced by having the background white, or light grey, and the vignetting-screen the same colour; the result in this case being very similar to the crayon heads to which Sir Thomas Lawrence gave such popularity. In some persons, we know, an impression prevails that it is necessary to communicate motion to this vignetting-screen during the time of sitting. We have not, however, found it necessary in our own practice to do so, if care be taken to avoid bringing it in any degree into focus; and we are, moreover, much inclined to think the motion would be a positive evil, in distracting the attention of the sitter, and risking movement on his part. A good method of fixing this vignetting-screen in front of the lens, is to place it in a light wooden frame, attached to a stand something like a pole fire-screen, so that it can be moved up and down, to suit the position of the camera. Those who are anxious to communicate a swinging motion, backwards and forwards, to the screen, may do so most simply by causing the frame containing the screen to rest on a stand, supporting on two points, on which it may swing. The motion may easily be communicated, and kept up a sufficient time, by attaching to the bottom of the frame a bent wire with a leaden weight at the bottom, like that used to keep up the swinging motion of children's toy rocking-horses.

Some time ago, we remember to have seen a dark slide for a stereoscopic camera made of paper. It was intended to carry dry plates, but was stated by the maker, an ingenious amateur, to be perfectly efficient for use in the wet processes. We had intended to give an epitome of the inventor's description of their manufacture; but, on carefully examining it, we find it somewhat long and complicated, and referring, moreover, chiefly to the especial requirements of the camera they were intended to fit. Without entering into a detailed description of the process of making them, we shall confine ourselves to a few brief hints, for the guidance of the experimentalist who may wish to try his hand at their manufacture. It is desirable in all cases to prepare first a piece of wood, the size of the inside of the slide, to serve as a block or mould on which to work. Cardboard, not paper, is the right material to work with; a slight cut with the point of a penknife rendering it at all times easy to bend the card perfectly true and square. It is desirable that the whole of the card used should be well varnished, to render it quite impervious to moisture; three or four coats of the lac varnish we have already named will answer the purpose perfectly. The insides of the slides should be coated with black varnish. Glue is preferable to paste for joining, as affording more rigidity in the finished work. Grooves can be easily formed by glueing strips of card upon each other at requisite distances. Thin glazed calico, used by bookbinders, will afford the neatest and most serviceable covering for the whole. The details of working will depend on the form of camera the slides are to fit; but a little skill and ingenuity, and attention to these suggestions, will, we think, enable the amateur to produce what he requires.

The field we have been traversing is almost boundless; but our purpose has been rather to suggest right methods of working, and to give a right direction to ingenuity, than to work out everything into such detail as should leave nothing to the skill and contrivance of the amateur. We trust we have succeeded in this aim, and with this chapter take leave of the "Amateur Mechanic."

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 24th June, 1860.

Magic pictures have been heard of which, when viewed in a certain point through a lens, exhibit an object perfectly different from that seen by the naked eye. Niceron tells us that he executed at Paris, and deposited in the library of the Minimes, a picture of this kind. When seen by the naked eye, it represented fifteen portraits of Turkish sultans; but, when viewed through the glass, it was a portrait of Louis XIII.! Surely, this is quite as wonderful as the stereoscope!

There are many different means employed here for preserving photographic paper. It will, perhaps, not be useless to enumerate them briefly.

Beginning, then, with the most simple of all—that of M. Belloc, and a thousand others. The papers when dry—after the nitrate bath—are closed up tightly in a portfolio. In dry weather, the paper thus slightly protected will often become yellow in some four-and-twenty hours; but, in cold weather, will remain tolerably white for about eight days. The same may be said of certain apparatus sold in Paris for this purpose, and in which open vessels of chloride of calcium, or other absorbent substances, have been placed to withdraw all the moisture.

M. Laborde, the ecclesiastic photographer, places his papers between dry plates of glass, so as to form a high column somewhat resembling a voltaic pile. The pressure upon the paper prevents the access of air, and the former may be preserved in this manner for a considerable time. The same author asserts, likewise, that, if the nitrated paper be rolled up and placed in a large bottle, a few grains of camphor placed at the bottom of it will impede its gradual colouration by external agents.

M. Gaumé places his sensitised paper in a wooden box, the interior of which is lined with slabs of plaster of Paris, or gypsum, previously dried at a high temperature in an oven. The plaster of Paris thus dried, soon absorbs any moisture contained in the atmosphere of the box. The latter must close perfectly.

The greatest rival of Lord Brougham, in the mathematical world, is certainly his friend M. Chasles, President of the Institute, who is ever actively filling the *Comptes-Rendus* of the Academy with long geometrical dissertations, which will, perhaps, come practically into play about the year 1999, perhaps before.

M. Regnault, Member of the Institute, and Professor of Physics at the *College de France*, has just published an extensive paper upon the elastic forces of vapours. The first part of these researches dates from 1845. The tables which accompany this interesting work will prove extremely useful to those occupied in the physical and chemical departments of science.

M. Em. Monnier has employed permanganate of potash in graduated tubes, to determine the quantity of organic matter contained in several very impure and purer waters, principally of rivers. This method might, perhaps, be relied upon in certain cases, where the water contains nothing, except organic matter, that could reduce the permanganate. But as ammonia, sulphuretted hydrogen, sulphurous acid vapours, and a great quantity of other substances that may reasonably be supposed to be present in the rivers of large towns, produce a similar effect, M. Monnier's method cannot be looked upon as generally applicable.

M. Elie de Beaumont has just presented to the Academy, in the name of the author, M. Marcel de Serres, the third edition of a work which will doubtless be perused with interest in England, the country of all others where geology appears to be most generally cultivated. The title of the work in question is: "*De la Cosmogonie de Moïse comparée aux Faits Géologiques.*"

Those who are fond of cucumbers and similar plants, will read with pleasure M. Ch. Naudin's "*Revue des Curcurbitacées cultivées au Muséum en* 1859;" a little pamphlet, in which the author treats of an immense variety of these plants cultivated at the *Jardin des Plantes* during the year 1859.

The Spanish Government, wishing to aid as much as possible in the endeavours of those *savants* who are to visit Spain, with the intention of observing the solar eclipse of the 18th July next, has ordered the free entry of the astronomical and photographic instruments of each astronomer, on condition of his proving himself a visitor, and giving a guarantee for the duty until the above-said instruments leave the country. These instructions have been forwarded to the custom-houses of Santander, Bilboa, St. Sebastian, Irun, Etizondo, La Junquera, Barcelona, Tarragona, Castellan, and Valentia. Moreover, the governors of all the provinces have received orders to aid and protect the scientific travellers that may happen to pass through their districts; and the rectors of the Universities of Valladolid, Oviedo, Valentia, Barcelona, and Saragossa, have been requested each to choose a professor of science, to furnish any information that may tend to facilitate the undertaking. Indeed, we may be said to have arrived at the epoch Galileo foresaw, when in the dungeons of the Inquisition!

Some English papers have attached too much importance to the fact I announced to you in one of my recent letters concerning the presence of nitrates in guano. It must be remembered that M. Boussingault only discovered exceedingly small quantities of nitric acid in this substance, and consequently, that the commercial value of guano will not be at all affected by this discovery, however important in a scientific point of view.

An important problem was that of readily obtaining pure silver from old, worn-out, plated utensils of copper, &c. A recent number of the *Moniteur Scientifique* publishes valuable information on this subject by M. Soelzel. The best method consists of treating the plated work by sulphuric acid, in which from 5 to 10 per cent. of nitrate of soda has been dissolved. The silver disappears as if by magic in this solution, before any of the copper is at all acted upon.

A Catechism of Chemistry.

MOLECULAR ATTRACTION—(*continued*).

Q. It has been mentioned before that liquids are elastic: can they be compressed into smaller bulks than they usually occupy?

A. They can; but only to a very limited extent.

Q. To what extent is water compressible?

A. When subjected to a pressure of one atmosphere, one million parts of water are reduced in bulk 51·3 parts.

Q. Are other liquids equally compressible?

A. No; mercury, under the same circumstances, is only reduced 5·3 parts, whilst ether is diminished in bulk 145 parts.

Q. What is meant by "a pressure of one atmosphere?"

A. A pressure of 15 pounds to every square inch of surface—that being about the weight of a column of air one inch in section, and the height of the atmosphere.

Q. Are the properties of elasticity and expansibility of gases ever applied to useful purposes?

A. Yes; there are many instruments in common use, which depend upon these properties; such are the air-pump and condensing syringe, household-pump, barometer, syphon, the pneumatic trough, &c.

Q. What is *cohesion?*

A. Cohesion is that force which tends to bind the particles of bodies together, and, according to the proportion that it bears to other forces, like heat and elasticity, causes the body to assume the solid, liquid, or gaseous state.

Q. What are the results of the variations of this force in solids?

A. It produces all the differences which are observable in bodies in respect to their hardness, elasticity, brittleness, malleability, and ductility.

Q. What is the hardness of a body?

A. The hardness of a body consists in the degree of resistance which the particles offer to the slightest change of relative position.

Q. Does the same substance vary in hardness, under different circumstances?

A. Yes; steel, when heated to redness and slowly cooled, is soft, and may be easily cut with a file, and even squeezed into a hardened die; whilst the same piece heated to redness and suddenly cooled, by quenching in water, becomes as brittle as glass, and nearly as hard as the diamond.

Q. Upon what do malleability and ductility depend?

A. These qualities are only exhibited by the metallic elements; they consist in a property of extending under influence of pressure. They are the opposite of brittleness. These properties depend upon the molecules of the solid admitting of very considerable relative displacement, without losing their cohesion.

Q. Is there any power of cohesion in liquids?

A. Yes. Liquids, although they possess this power in a much less degree than solids, still have a very appreciable amount of cohesion.

Q. How is this power of cohesion in liquids seen?

A. The rounded form assumed by detached drops of liquid, such as is seen in the drops of dew upon a leaf, is caused by the exercise of the force of cohesion.

Q. Do liquids vary in their powers of cohesion?

A. Yes. Some are more *limpid* than others—that is, have less cohesion amongst their particles. Such is ether, which has less cohesion than alcohol; this, again, is more limpid than water.

Q. How may the degree of cohesion in different liquids be known?

A. It may be roughly estimated by shaking them. In liquids which possess little cohesion, the bubbles which are produced by agitation quickly rise to the surface, break, and disappear. In those, on the contrary, which possess much cohesion amongst their particles, such as gum-water, syrup, oil, &c., the bubbles rise slowly and break with difficulty.

Q. Is the force of cohesion capable of being increased or diminished?

A. An increase of temperature has a tendency to decrease the power of cohesion; and there is every reason to believe that, at a sufficiently high temperature, this power would be entirely destroyed; on the other hand, by a sufficiently low temperature, bodies which now do not possess it, would become endowed with this property.

Q. In what manner would this be the case?

A. All analogy tends to show that, at a sufficiently high temperature, every substance would be in the gaseous state, *i.e.* would be without cohesion amongst its particles; whilst with a sufficient reduction of temperature, all bodies which are now only known as gases, or liquids, would become solid.

Q. What is the difference between the forces *cohesion* and *adhesion?*

A. Adhesion gives rise to several most important phenomena. It influences the *melting* of different solid bodies by water and other liquids; it is mainly concerned in the production of capillary action; of solution; of the diffusion of liquids: it is also the powerful cause of that resistance to motion which is termed friction. The power of adhesion which is possessed by caoutchouc, renders this substance invaluable to the chemist and photographer. The entire value of cements also depends upon this power.

Q. Is the force of adhesion uniform in its action between different bodies?

A. No; it varies very greatly. This is well illustrated by the different values which cements have, according to the substances to be united. Glue, or gum, may be used with perfect success for cementing pieces of paper or wood, whilst they would be quite inapplicable to joining glass, which requires some resinous cement. The different amounts of friction exerted between different bodies, and the effect of lubricating agents in diminishing friction, are all examples of the variations in power of the force of adhesion.

(*To be continued.*)

Proceedings of Societies.

FRENCH PHOTOGRAPHIC SOCIETY.

At the last meeting of this Society, held on the 15th instant, M. Wulff made some experiments with the photogen, or artificial light for photographers. The first attempt produced no result, and the second gave upon a collodioned plate only a very weak positive; the time of exposure was from seventeen to twenty seconds. The light was vivid and steady; but, in view of the result obtained, it cannot be said that the problem was very satisfactorily solved. It is probable that the operator had omitted some necessary precautions, or that collodion and chemicals were out of order.

M. **Bertsch** exhibited a very beautiful proof of large dimensions, obtained by his enlarging apparatus from a stereoscopic picture taken by M. Ferrier. The enlarged image, it was remarked, presented a finer effect of relief than is found in pictures of large dimensions obtained direct in the camera. M. Bertsch justly attributes this effect to the original picture having been taken with a short focus lens. He insisted upon the advantages presented by proofs taken under these conditions, inasmuch as they give much better aerial perspective. He recommends to landscape photographers to give the preference to small proofs from nature, and afterwards to enlarge them to the desired dimensions. M. Bertsch's enlarging apparatus differs from the solar camera of Mr. Woodward in this respect, that by means of a lens placed between the magnifying lens and the picture, he throws upon the latter a flood of parallel light proportioned to its dimensions, by means of diaphragms.

Mr. E. **Delessert** exhibited two proofs enlarged by means of the solar camera. They were two studies of females, full length. In one the face was concealed; the other was a study of the back of the figure: they were, however, rather studies of drapery than portraits. But it was difficult to imagine anything more satisfactory in an artistic point of view. Their value to painters must be very great.

M. **Gerard** exhibited a proof obtained upon waxed paper, which had been kept in one of Marion's preservative cases for just a year.

It was announced that M. Disderi was successfully experimenting with a solution intended as a substitute for the nitrate of silver bath, which the inventor calls *photographic ink*. This new bath will have the effect of economising the expensive manipulations of photography, at least one-third. M. Disderi will shortly give an exhibition of the method to a select company of amateurs and operators.

Photographic Patents.

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MELHUISH'S IMPROVEMENTS IN THE CONSTRUCTION OF PHOTOGRAPHIC CAMERAS.

This invention has for its object improvements in the construction of cameras for obtaining photographic pictures. In constructing cameras according to my invention, I make the body of the camera of metal (usually of brass); the bottom, top, and sides of the body are soldered, or otherwise fixed together; and the front which carries the lens or lenses, which are mounted in the usual manner, slides in guides fixed to the sides of the body, so that the front can be moved up or down to adjust the position of the image before taking the picture, and the front with the lens or lenses may be entirely removed from the body of the camera for convenience of packing the slides therein. When it is desired to reduce the depth of the camera from front to back as much as possible, a tube or tubes are fixed to the front of the body, so as to project therefrom, and on the ends of the tube or tubes the lens or lenses are mounted. The case or dark slide for containing the sensitive plate or surface is introduced by an opening at the top of the camera, as heretofore, and in the bottom of the camera, and at the back thereof, a slit is formed, through which the slide may be drawn down to expose the sensitive surface when taking a picture; this arrangement is more convenient than drawing the slide up by the opening at the top, as usual heretofore. The case or dark slide is also made entirely of metal; the slide which closes the front thereof is, when closed, secured by bolts. The handle or handles with which the case or dark slide is fitted are, for convenience of packing, made to spring, so that they may be pressed down flat on to the case or slide. Frequently I make the case or dark slide double, to receive two sensitive plates or surfaces back to back. For this purpose both sides of the case slide out to expose the sensitive plates or surfaces, and the top of the case or slide also slides out to allow the plates or surfaces to be put in. The ground glass used in focussing is mounted in a metal frame, that it may pack into as small a space as possible. Where two lenses are employed in cameras to take stereoscopic pictures, the partition in the camera to separate the two images formed by the lenses is made to take out, in order that the dark slides and focussing-glass may be packed away in the interior of the camera.

Miscellaneous.

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Influence of the Stereoscope upon Popular Taste:—An American contemporary has the following:—The remarkable success which has attended the introduction of stereoscopes affords a theme for reflection, both in reference to their inherent merit and the influence they are destined to exert in moulding the artistic mind of our nation. The warm reception given to them shows the existence of an innate sense of *the beautiful* in the minds of our citizens, which needs but the time and the occasion to develop itself into a true artistic judgment. The imputation that Americans are a people entirely devoted to providing for the practical necessities of life—educating their children to be sharp, narrow, and shrewd, rather than broad, genial, philosophical, and appreciating—is rapidly giving place to respect for a people whose history has shown them practical when their physical wants demanded it, but devoted to the finer arts when their means afford them the time necessary to devote to such studies. We have only to look at the manufactured articles of merchandise, daily offered for sale in our stores, to discover this innate appreciation of *the beautiful* in our people. A mere machine, in order to sell in the American market, must not only be effective, but it must be well proportioned and arranged with an eye to please. Our sailing vessels, so far as beauty of construction is concerned, are certainly good specimens of mechanical art. The vessels that line our wharfs would hardly be recognised as the descendants of the broad-bottomed crafts that floated the Dutch founders of this city from the old Amsterdam to *New* Amsterdam. Good Governor Wouter Van Twiller could scarce set himself down upon the narrow deck of one of our modern clippers; and in this narrowness of vessels we have not only gained utility of speed, but beauty of construction. We therefore think that we have some reason for believing that there has been a new element engrafted in the constitution of our people, resulting from their emigration to this new world, and which we can only explain by attributing it to the peculiar features of our social and political institutions. The stereoscope is one of the means destined to advance our national taste for art. It affords amusement and instruction to children, and pleasure to old age. Its cost is so little that we can calculate on its penetrating the homes of the humblest men, who, with but very little money and time, can themselves take the pictures, and thus keep a new and varied stock of photographs. With a pile of pictures by their side, which cost almost nothing, they can make the European tour of celebrated places, and not leave the warm precincts of their own firesides.

Pursuit of Photography under Difficulties.—At Strasbourg, on the Rhine, the execution of a woman condemned to death at the last assizes, took place on the Place d'Austerlitz. A certain photographer of the city, Aaron Gerschel by name, thought he would profit by the occasion, and take a view of the tragic ceremony. Being successful, he exhibited proofs of his skill at the corner of the street Des Grandes Arcades, and on the Place Kléber, without previously obtaining permission from the civic authorities. A visit from the police served to remind him of his omission. He was summoned before the Tribunal of Correctional Police, and found guilty of infringing article 22 of the decree on the press, which sets forth that no drawing, engraving, lithograph, medal, stamp, or emblem shall be publicly exhibited or offered for sale without permission previously obtained from the minister of police at Paris, or the prefets in the departments. The poor photographer was condemned to a month's imprisonment, fined 100 francs, and the confiscation of the photographs seized.

Chemical Action of Light.—When a solution of oxalic acid is exposed to the influence of the sun's rays, a gas is disengaged. It was supposed that this gas was carbonic acid, arising from the combustion of the oxalic acid by the oxide of uranium; but it is proved by the researches of MM. Nièpce de Saint Victor and Corvisart, that the gas is a mixture of carbonic acid and *carbonic oxide*. This remarkable fact is worthy of the attention of chemists and physiologists. Quantitative analysis of the gaseous mixture will show the nature of the reaction. The same chemists have shown that starch, under the influence of solarisation, is changed into sugar. It was thought that the acid of the salt of uranium might play a part in this modification; but it appears it does not, for the saccharification takes place in the absence of all acid. M. Corvisart believes that the simultaneous action of light and heat is required; at least, the solarisation in winter did not appear to him to modify the hydrated starch. These experiments will doubtless throw a new light upon the phenomena of vegetable life.

Photographic Notes and Queries.

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PRESERVING SENSITISED PAPER.

Sir,—Should you consider the following worthy of a corner in your valuable journal, it is at your disposal.

Procure a wide-mouth stoppered bottle, which is made impervious to light by coating it with black varnish, or any other suitable substance; then introduce a small phial containing chloride of calcium, which must be lightly corked, or, better still, with a hole bored through the latter. I have preserved paper, ready sensitised, in a case made in the above manner for nearly a month, which is as yet unchanged. Falcon.

Sheffield, June 26, 1860.

FORMULÆ FOR TONING POSITIVES.

Sir,—I will really feel much obliged if yourself or some correspondent could furnish me with a certain method of getting a pure jet or ebony black tone (not a blue black) in my albumenised positive prints.

In the new mode of toning—the alkaline gold bath—you, no doubt, get very fine tones, such as a rich brown, violet, purple, &c.; but, if you try to get a jet black, you fail, and, instead, have a picture of an unpleasant inky-blue colour. Is there any way of overcoming this difficulty, and, at the same time, using a sensitising bath of 50 grains of silver—viz., by any addition to the salting, sensitising, toning, or fixing bath?

Again, Mr. Crookes and several correspondents advised adding acetic acid to the silver bath for positive prints. On the other side, you and others—equally experienced—say, "add no acetic acid to this bath." Pray, how is a simple amateur to act? or is it immaterial which side he follows?

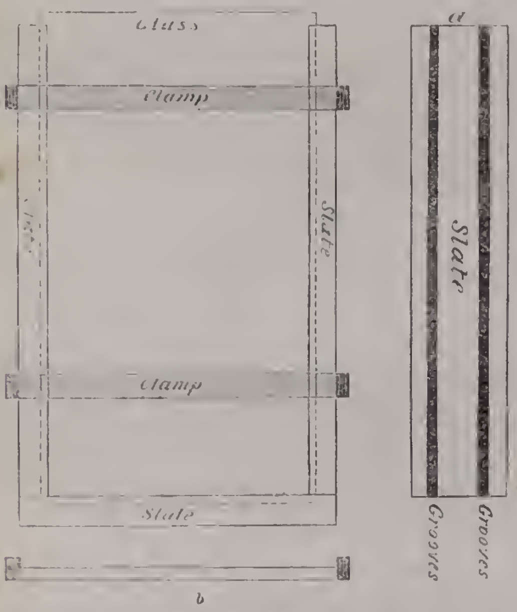
No end of additions to the silver bath have been proposed: for instance, nitrate of lead, at the rate of 2 per cent., to the silver bath, and acetate of lead to the fixing bath; but, while these additions often tend to give very fine tones, I doubt whether the addition of lead, in any shape, is calculated to add to the permanency of the positive paper print. I have got a copy of the print furnished by M. Joubert to the London *Photographic Society's Journal*, which, to me, appears very good. Permanence is another question, and, secondly, cheapness, should M. Joubert disclose his process.—I am, sir, yours respectfully,

Glasgow, June 25, 1860. GLASGUENSIS.

[Another correspondent, writing on a similar subject, observes that no printing process has yet been discovered by which an ebony black tone can be obtained; there will always be a blue tint.—ED.]

A STRONG BATH.

A correspondent has favoured us with the following description of a strong bath:—"Take three strips of slate 1 inch in breadth, ½ in. thick, ploughed with a plough or coarse piece of saw 3-16 in. deep (see fig. *a*).



Then get two sheets of flat glass—say ⅛ in. thick, full; make the edges rough with sand, or a piece of brick. When this is done, *lay strips of india-rubber along* the grooves, and then clamp it up with wood (fig. *b*). Make edges hot; run shellac down the openings, so as to secure. It is more secure by placing the india-rubber in the grooves before dropping in plates of glass."

DRYING SENSITIVE PLATES.

SIR,—From time to time your correspondent, "Thomas Clarke," has offered some very useful, and, I may say, valuable suggestions, not the least of which is that for a box for drying sensitive plates, as described in No. 92 of the "NEWS." As one of the great objects to be attained by a drying box is to prevent stains to the sensitive plates from coming in contact with the wood, I beg to suggest that, instead of allowing the plate to rest upon blotting paper at the bottom of the box as proposed, the chance of stains would be entirely avoided by placing two bars of glass tubing along the length of the box, and cutting notches in them with a file wide enough to prevent the plates slipping. By this means the plates would be perfectly drained upon the purest material. The bars of glass could be either laid in grooves, readily cut with a gouge—fastened to the box with marine glue, or jammed at the ends sufficiently firm to prevent them moving. With this addition to "T. C.'s" box, I fancy it will be nearly perfect, though I don't quite appreciate the object of the yellow glass lid proposed.—I am, sir, your obedient servant, FRED. M. YOUNG.

TO CORRESPONDENTS.

POSITIVE; WINSLOW.—1. Lac is the shell-lac of the shops. You can purchase it of an orange colour, or bleached; if the latter, avoid it if it be easily crushed between the fingers; in that case it has become decomposed by contact with the atmosphere. 2. We prefer iodide of cadmium as an iodiser; but iodide of potassium answers very well when the collodion is not kept very long.

Q.—As the failure cannot arise from the camera or lens, it may lie with the collodion or silver bath, but most probably in the manipulation, in draining the plate. Examine the image on the ground glass; if that be perfect all over, a perfect image ought to be produced on the collodion. Your description of the defect is not very precise.

W. JONES.—The method is theoretically correct, but practically difficult. Of course no light whatever must fall upon the sensitive paper, except what passes through the lens. Try the experiment on a small scale first, upon iodised paper: this will satisfy you whether the conditions of success are met.

J. MAWDSLEY.—See "PHOTOGRAPHIC NEWS," Nos. 91 and 92, for account of M. Gaudin's nitrate of iron developer. If it operates too quickly, dilute it, and add a little acetic acid. We cannot undertake to reply privately to correspondents.

O. P. Q.—All the hyposulphite of silver was not washed out of your negative; consequently, when you attempted to strengthen it, the hypo. was decomposed by the developing solution, and the negative became stained with sulphide of silver.

ONE WHO IS PUZZLED.—The source of the annoyance is doubtless in the developing solution. Try Davanne and Jonet's, given in No. 94, third answer to correspondents; or M. Gaudin's protonitrate of iron developer, in Nos. 91 and 92.

INQUIRENS.—See Mr. Melhuish's advertisement in the "PHOTOGRAPHIC NEWS," June 1. An amateur, doubtless, requires as good apparatus and materials as a professor; only, if he works for amusement, the penalty of failure is not so onerous.

LENS.—We do not object to the term *objective*, it is clear and precise; the plain English of it is *object-glass*. "Lens" has the same relation to "objective" as "letter" has to "word."

CHROMATIC.—We should as soon think of quoting Dr. Dee on astronomy as Field on colour. It is not an uncommon thing for people to write dogmatically upon subjects of which they really know nothing.

H. T. T.—It is probable that the gold is precipitated from the toning solution. Use the double chloride of gold and potassium, or the Abbé Laborde's formula, page 11, vol. iv.

AMATEUR.—If you persist in keeping the bane, you ought also to keep the antidote near by. Protosulphate of iron is the best antidote for the poisonous effects of cyanide of potassium.

DEAN, T.—The reflecting stereoscope has gone out of use since the introduction of Dr. Brewster's refracting stereoscope. The former was invented by Professor Wheatstone.

WALTON.—You ought to make yourself acquainted with the principles of photography before undertaking its practice. Would you venture to take command of a ship, without some knowledge of navigation?

MOSES.—No arrangement for binding has been made with the agent. A cloth case for vol. iii. may be obtained direct from the office, by sending postage-stamps. The price is 1s. 6d., and postage 4d.

T. R.—You will not be satisfied with the result in French plain paper. Proofs are better on English plain paper, but albumenised paper gives finer detail.

PERPLEXED.—Filter your nitrate bath every day after using it. The defects in your negatives are due to minute particles of collodion floating in the bath.

SOLAR.—It is an error to suppose that a large lens is necessary to obtain a large picture; the size of the latter depends on the length of the focus of the lens.

P. P.—We do not expect there will be another Photographic Exhibition in London before next winter. You can doubtless exhibit at the Crystal Palace.

TROY.—It is much better to give formulæ in *parts*; they are then applicable to every system of weights and measures, and to every scale of operations.

G. G.—There is nothing better for the purpose than white lac varnish; it is sold as Sœhnee negative varnish.

S. A. A.—Sel d'or is the safest for a toning bath; if chloride of gold is used, see that the solution is alkaline.

AN OLD SUBSCRIBER.—It may not be very flattering to say it, but the defects in your plates are evidently due to imperfect manipulation.

HAYES, W.—Slate is the cleanest material for sinks and troughs, and also for cisterns. It resists the action of most of the acids.

DARK BOX.—We cannot advise you to take out a patent. You may, however, register your invention.

A SUBSCRIBER.—The first number of the third volume of the "PHOTOGRAPHIC NEWS" (the last volume completed) is No. 53.

J. STONE.—We cannot undertake to recommend dealers; such a task would be invidious. Consult some experienced photographer.

OMBRA.—Read carefully the articles on colour, in current numbers of the "PHOTOGRAPHIC NEWS."

V. V.—You will not find much difference in price among various manufacturers. Competition is the best security a purchaser can have.

PETER.—Your negative is spoiled by over-development. There is now no remedy for its defects.

A. G.—Give the preference to the simplest formula on all occasions. With some operators complexity is a disease.

L. T.—An embossed cover for the "PHOTOGRAPHIC NEWS" can be obtained for 1s. 6d. through your bookseller.

PHOSPHOR.—A positive picture is much weaker than a negative, hence the difficulty of converting the former into the latter.

TYRO.—In your present state of photographic experience, we do not suppose you would be very successful in any attempt at instantaneous photography.

A. B.—Begin with stereoscopic pictures; they are more easily managed, and the loss from failure is not so onerous.

SALTER, R.—It is obviously a typographical error, and does not need special correction.

⁂ All editorial communications should be addressed to Messrs. CASSELL, PETTER, and GALPIN, La Belle Sauvage Yard, London, E.C.

THE PHOTOGRAPHIC NEWS.

Vol. IV., No. 96.—*July* 6, 1860.

COLOUR IN ITS RELATION TO PHOTOGRAPHY.*

BY CHARLES MARTEL.

The great desideratum in photography is an agent susceptible of being affected equally by all the colours of the spectrum. Iodide and chloride of silver are affected principally by the blue rays, and by the compounds of red with blue, as in the various hues of violet—purple, indigo, hyacinth, lavender, &c. Bromide of silver is promptly susceptible to the influence of the green rays. If a film sensitised with bromide of silver be exposed to the influence of a very luminous spectrum for 10 or 20 minutes, it will be seen that the red, yellow, orange, and green rays, have acted strongly upon the sensitive film, while the action of the blue and violet rays is less marked. It is probable that experiments with other substances may lead to the discovery of the desired photogenic agent.

In studying the photogenic influence of colours, we find that between the two extremes, black and white, they may be arranged as follows :—

White		
Sky blue		
Blue	blue series	
Indigo ...	....	
Violet	....	
Red	....	red series.
Orange ...	....	
Yellow ...	yellow series	
Green		
Black		

To the eye, the maximum of brilliancy and splendour is found in the red series; the blue series ranks next in splendour, and then the yellow.

In experimenting on the photographic effect produced by the iodides of potassium and cadmium respectively, the following results were arrived at, in white, black, and various tones of normal grey :—

Colours.	Composition of the Hues.	Photographic Effect.			
		With Iodide of Potassium.		Iodide of Cadmium.	
		Deepest Tones.	Lighter Tones.	Deepest Tones.	Lightest Tones.
White	White lead	White	White	Not different from potassium.	The half-tones appear more luminous, or not so black.
Sky blue	Cobalt and white	White	White		
Blue	Prussian blue	Grey	Grey		
Indigo	Indigo	Medium grey	Medium grey		
Violet	Carmine and P. blue	Grey	Grey		
Red	Carmine	Medium grey	Grey		
Orange	Orange vermilion	Medium grey	Medium grey		
Yellow	Indian yellow	Deep grey	Medium grey		
Green	Prussian green	Black	Almost black		
Black	Lamp black	Black	Almost black		

Thus, between pure white and absolute black, we find an intermediate tone, which we term medium grey ; between this latter and white, two tones of grey : viz., grey and deep grey. To represent all the ten colours of the scale, five tones between white and black suffice ; thus :—

White Sky Blue	are represented by white.
Blue Violet Rose	are represented by grey.
Yellow . . .	is represented by deep grey.
Indigo Red Orange Yellow	are represented by medium grey.
Green Black	are represented by black.

The various intensities of these colours, so long as white does not predominate, do not alter the photographic effect, except rose, which is equal in photographic power to blue and violet at their maximum intensity. This is probably due to the fact, that the light tones of carmine-red belong to the blue scale.

This maximum of intensity in pigments demands some consideration ; the pigments which may be taken as the representations of the three primary colours, that is to say, concentrated purple—madder for *red ;* bitumen mixed with yellow lake for *yellow ;* and prussian blue, for *blue ;* each of these pigments, when ground in oil, is apparently black. Mixed with white, the concentrated madder becomes *red ;* the bitumen, *yellow ;* and the prussian blue, *sky blue ;* and it is asserted that the concentration of the colours obtained by the solar rays passing through a prism, produces the same effect, if the concentration be sufficient. What is here stated will show to the photographer how important to him is the consideration of the subject of intensity or *tone*, as by it, and through it, all his artistic results are produced.

It will be instructive to compare the photographic effect of the above scale with the method of translating colour by tone, adopted by the engraver. He reproduces the ten tints nearly as follows :—

The white	by white.
— sky-blue and yellow ...	by light grey.
— orange	by grey.
— blue ... ... — violet ... ... — red	by a deep grey of nearly the same tone for all three colours.
— indigo	by a still deeper grey.
— green	by a medium grey.
— black	by black.

In all, six tones, but placed very differently from those in the photographic image, and which, by their relative value, render the relation of tones much better to our eyes, as they are the result of luminous intensity upon our visual organ.

Examination of the photographic image of the spectrum, produced on iodide and bromide of silver, shows that in each there are certain hues that give no impression, or, at least, produce an effect only after a considerable lapse of time compared with the other hues. Fortunately, however, these obscure points in each image of the spectrum are very small, corresponding to the transition of the yellow to the green, consequently the mixture of the two iodides admit of our obtaining the whole, or, at least, the majority of colours and their hues.

It will at once occur to the photographic artist, that the two most abundant colours in nature (landscape) present the greatest difficulties, especially when they are opposed to blue and white ; and this is exactly what happens : for the colour not only influences, by its intensity, the tone in which it is reproduced, but it also has an influence on the general perfection of the proof. The confusion in which the outlines of the foliage of trees is rendered, is often due more to the colour of its leaves than to its motion. Blue, grey, and violet objects yield much sharper images. Views of edifices are much more easy to take, and are generally superior, in an artistic point of view, to landscapes, provided the extreme sharpness of the lines be subdued. The question of aerial perspective belongs at present to the department of optics, and, when thoroughly investigated, it is not improbable that it may lead to important changes in photographic operations.

In a photographic view (landscape), the sky is always the most luminous portion of the picture, except reflections from the calm surface of water. The transition is from the sky to the extreme distances, the remotest planes in the picture, which are next in luminous intensity, and at the horizon; the outlines forming it should not be harsh or sharp, but soft and misty. The practice of stopping-out the sky in a photograph is very injurious to the effect of the picture, and quite destroys its harmony in an artistic sense. In consequence of the quicker action of light on the sensitive film at the extreme distance, and in the sky, photographic truth is almost impossible, as these portions of the picture are taken before the details of objects in the foreground are brought out. The extreme distances, in certain conditions of the atmosphere, are, like the sky, soon solarised, and appear in the photograph only as white; the intermediate distances, containing trees probably, although slightly illuminated by the blueness of the atmosphere, appear of too deep a tone, relatively to the other portions of the landscape; while the green of the meadows, trees, bushes, the dusty yellowish roads, are rendered nearly black. At present, this want of truth is only partially remedied by modifying the exposure, still leaving some truth to be sacrificed. By exercising great tact in the exposure, and choosing the best hour in the day for taking the view, the want of harmony so apparent in most photographic landscapes may be remedied.

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* Continued from vol. iv. p. 98.

Both the physical and chemical constitution of bodies, when of exactly the same colour, has a marked influence on the photogenic result, doubtless caused by their different power of reflecting white light. Thus, supposing pieces of woollen, cotton, silk, satin, and velvet, to be dyed in the same vat, they will appear to be very different in hue, and will actually produce a very different photographic effect from the cause assigned above. This power coloured bodies possess, of reflecting variable quantities of white light, in addition to the coloured light, demands special attention from the photographer; and due regard to it is an element of success in successful portraiture as well as in landscape. There are certain difficulties to be overcome in artistic photography, which can only be surmounted by making some sacrifices. The vulgar will bestow more admiration on a portrait in which all the minute detail of lace, jewellery, a striking pattern in the dress, are reproduced, than upon one in which these details are more or less sacrificed to a good chiar-oscuro. In spite of the artist's better knowledge and taste, he may find it is his interest to humour his public. He must, therefore, to some extent, sacrifice art or fortune, until the public become better informed as to the principles of art. Still, he should only make concessions to bad taste when it is unavoidable; by following out in his works the principles acquired by study and observation, he becomes, in his turn, a teacher of art, and gradually assists in correcting the bad taste that interferes with the excellence of his resources.

ON THE PRINCIPLES OF THE SOLAR CAMERA.*

BY A. CLAUDET, F.R.S.

The solar camera, invented by Woodward, is one of the most important improvements introduced into the art of photography since its discovery. By its means small negatives may produce pictures magnified to any extent; a portrait taken on a collodion plate not larger than a visiting-card, can be increased in the greatest perfection to the size of nature; views as small as those intended for the stereoscope, can be also considerably enlarged.

This is an immense advantage, which is easily understood when we consider how much quicker, and in better perspective, small pictures are taken by the camera-obscura; while the whole photographic manipulation is so greatly simplified.

There is nothing new in this enlargement of photographic pictures. It has been done long ago, by attending to the law of conjugate foci; and every photographer has always been enabled, with the common camera, to increase, as well as to reduce, the size of any image.

To magnify the image, it was only necessary to place the original very near the camera, and to increase in proportion the focal distance. But the more the focal distance was increased, the more the intensity of light was reduced; and a still greater loss of light arose from the necessity of diminishing the aperture of the lens, in order to avoid spherical aberration, and to obtain a more perfect definition of the image. Such conditions rendered the operation so very long, that it became nearly impossible to produce any satisfactory results, particularly when the picture was to be considerably enlarged.

For these reasons it naturally resulted that, if the negative, having its shadows perfectly transparent, was turned against the strong light of the sun, its image at the focus of the camera would be so intense, that the time of exposure would be considerably reduced; and in order to employ in this manner the light of the sun, and follow its course without having to move the whole camera, it was thought advisable to make use of a movable reflecting mirror, sending the parallel rays of the sun on to a vertical plano-convex lens, condensing these rays on the negative placed before the object-glass and behind the condenser, somewhere in its luminous cone. Many contrivances for this object were resorted to, but without regarding anything else than throwing the strongest light possible upon the negative to be copied.

The constructors of these solar cameras never thought it very important to consider whether the focus of the condensing lens was better to fall before or behind the front lens of the object glass, provided the negative was placed in the luminous cone of the condenser. This want of attention has been the cause of making the solar camera a very imperfect instrument for copying and amplifying negatives.

The beautiful principle of Woodward's apparatus consists in his having decided the question regarding the position of the focus of the condenser, and in his having placed it exactly on the front lens of the object glass.

But as this principle has not yet been explained, when the apparatus was exhibited before the Photographic Societies of London and Paris, and not even by the inventor himself in the specification of his patent, Mr. Claudet has undertaken, in the interest of the art of photography, to bring the subject before the British Association, and to demonstrate that the solar camera of Woodward has solved the most difficult problem in the optics of photography, and is capable of producing most wonderful results. This problem consists in forming the image of the negative to be copied only by the centre of the object-glass, reduced to the *smallest aperture possible, without losing the least proportion of the light* illuminating the negative. The solar camera does not require any diaphragm to reduce the aperture of the lens, because each of the points of the negative is visible only where they are defined on the image of the sun, and they are so (in that position exclusively), for the centre of the lens, which is the only point which sees the sun; while the various points of the negative, which, from the marginal zone of the object glass, are defined against the comparatively obscure parts of the sky surrounding the sun are, as it were, invisible to that zone; so that the image is produced only by the central rays, and not in the least degree by any other points of the object glass which are subject to spherical aberration.

It is, in fact, a lens reduced to an aperture as small as is the image of the sun upon its surface, without the necessity of any diaphragm, and admitting the whole light of the sun after it has been condensed equally upon all the transparent points of the negative.

It is evident that, from the centre of the lens, the whole negative has the sun itself for background; and, from the other points of the lens, it has for background only the sky surrounding the sun, which, fortunately, on account of its weak light, has no effect in the formation of the image. Such is the essential principle of Woodward's solar camera, which could not exist in the former instruments when the focus of the condenser was either before or behind the object-glass; for in both cases the image of the negative was seen at once from the whole surface, and as well from the marginal zone as from the centre of the object-glass.

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* Read before the British Association, Oxford, 28th June, 1860.

Therefore, the image of the negative seen on the focussing screen of the object glass, is exclusively the result of the powerful rays which have been refracted through the very centre of the object glass, while the oblique rays refracted through its marginal zone, which would produce the confusion resulting from the spherical aberration being incapable of contributing to the formation of the image, are as if they had been entirely cut off by a diaphragm.

This result is truly marvellous, but it must be observed that the solar camera, precisely on account of the excellence of its principle, requires the greatest perfection in its construction, in order to render it capable of performing the various effects it is intended to produce, without losing any of its advantages. The solar camera must be as perfect as an astronomical instrument.

The reflecting mirror should be perfectly plane, and made with parallel surfaces, in order to reflect on the condenser an image of the sun without deformity, otherwise it would encroach on the marginal zone of the object-glass; and in order to have that image always on the very centre of the object-glass (for the same reason, the exclusion of the oblique rays), the mirror should be capable, by its adaptation to an heliostat, to follow the apparent motion of the sun. The condenser itself should be achromatic in order to refract the image of the sun without dispersion, and to define more correctly the lines of the negative; and a still more important point, for losing nothing of the photogenic light, would be to have the condenser formed with a glass perfectly homogeneous and colourless. Without all these conditions the solar camera would be but a very imperfect instrument; but with such an improved solar camera it would be possible to obtain results of the greatest beauty, and this instrument would become one of the most important discoveries for the perfection of photographic productions, if we could only depend more on the sunshine. This is, indeed, its only drawback, and a very serious one.

TRANSFERRING COLLODION NEGATIVES TO WAXED PAPER.*

BY M. TOULOUSE.

When the negative is of large dimensions, the sheet of paper may be insufficient to maintain the collodion film towards the end of its removal from the glass, in that case a second sheet can be applied, damp, upon the first, else the assistance of a second person must be obtained in order to effect the removal of the collodion with safety.

Application of the Waxed Paper.—The moistened paper to which the collodion adheres is laid smoothly upon a drawing-board, collodion uppermost.

Taking the camel's-hair brush, it is dipped in the solution of gum arabic, and spread over the whole surface of the collodion, very cautiously. The gum must be applied with a full brush to avoid tearing the film. When the collodion is covered with the gum, take the sheet of waxed paper and proceed to apply it to the collodion, commencing with the lower left-hand corner, but projecting above it about half an inch all round, guiding the operation with the T square; gradually lower the whole of the lower part of the waxed paper, and fix it to the board with pins, then continue to apply the waxed paper, with the aid of a triangle, so as to drive out all the air-bubbles, following the depression of the paper, until it is all applied to the collodion; then pass the triangle over it in every direction to make the adhesion complete, and to press out the excess of gum-water.

If there is any fear of damaging the collodion in applying the gum directly upon it, the waxed paper may be gummed instead, but this method possesses the inconvenience of altering the texture of the paper, which does not adhere so well to the negative. It also appears equally difficult to obtain good results by the use of paper previously gummed or gelatined. The transfer may also be made upon unwaxed paper, but it must not be attempted to wax it after the transfer is made, as the collodion is sure to be ruined.

Rolling.—When the triangle has performed its office, two sheets of thick blotting-paper or plate-paper, then a sheet of glazed card-board, are laid upon the waxed paper, and a wooden roller passed over the whole in every direction with a steady, even pressure.

The object of this operation is to perfect the adherence of the waxed paper, and to drive out any air or excess of gum that may remain. One of the greatest advantages of this operation appears to be in forming, by the gum penetrating the collodion, a sort of varnish, which imparts a brilliancy to the negative, and protects it against friction. Sometimes, in fact, when the operation is finished, we perceive that the surface of a dull negative has assumed a brilliancy it did not previously possess. This operation is not, however, absolutely necessary; the use of the triangle will be found in most cases sufficient.

Removal of the Damp Paper, and Drying the Negative.—After the preceding operation, take the negative and the two papers that cover it, and place them on a drawing-board, the waxed paper beneath; then, raising the four corners of the damp paper, fix the waxed paper by the corners, with pins, to the drawing-board; then remove the damp paper, beginning at one corner, leaving the waxed paper and negative on the board.

While the negative remains pinned on the board, it is as well to wash, with a piece of fine clean sponge, the edges of the waxed paper round the collodion, which are generally soiled with gum.

The negative must not be allowed to dry while it remains pinned to the board, as the collodion film, contracting in drying, will tear; it must be kept flat on the board by pieces of thick Bristol board being fastened over the edges all round, but not overlapping the collodion, else they may stick to it. When the collodion is dry, the waxed paper may be turned over on the board, so as to dry the opposite side.

Varnishing and Preserving the Negative.—No attempt to increase the transparency of the negative by warming the waxed paper must be made, as is usual with ordinary waxed paper proofs, for the collodion film would tear, and the negative be lost. Besides, if the operation has been well conducted, and good paper has been used, it seldom happens that the grain of the paper becomes coarse.

If, in the process of transferring, the negative is not so solid as could be wished—which sometimes happens when the negatives have been developed with sulphate of iron—then a very soft camel's-hair brush, charged with gum-arabic, may be passed over the collodion film, which will give it the desired clearness and solidity.

If a varnish that will soften in the heat of the sun be applied to the collodion film, the safety of the negative will be compromised; for the collodion, during the printing of positives, will adhere to the sensitised paper.

Transferred negatives should be preserved in albums or in portfolios, between sheets of blotting-paper: when removed from the printing frames, they sometimes roll up from the effect of heat; breathing on them is sufficient to restore them to flatness.

(To be continued.)

ENLARGING COLLODION PICTURES.

BY M. A. BERTSCH.

At the last meeting of the French Photographic Society, M. Aug. Bertsch exhibited a proof of very large dimensions, viz., 30·7 inches by 20·5 inches, enlarged from a negative measuring only 2·4 inches by 1·6 inches. Upon being invited by the president, M. Regnault, to give the particulars of the method he employed in obtaining so excellent a result, he made the following communication:—

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* Continued from vol. iv. p. 87.

In the enlargement of the original, I have not been limited by the minuteness in this little positive, nor by the fear of fringes of diffraction, but solely by the dimensions of my glass, and the impossibility of obtaining a longer focus.

Experience had long ago shown me that, under rational conditions of lighting, the enlarging has no limits, except those imposed by the manifestation of the molecular structure in the film or medium, which serves as a support for the little positive. When the light is quite parallel, and passes perpendicularly through the glass, it causes no refraction through the negative, and we begin to see the net-work structure of the film only after the collodion has been magnified 2,500 times, and the albumen 6,000 times. To obtain the sharpness which may be observed in this proof, it is necessary to work very quickly (this has been exposed only a quarter of a second), on account of the vibration caused by the traffic in the street, and particularly by that arising from the progress of the sun. Immediately the sun changes its position appreciably, the axis of the bundle of rays ceases to be parallel to the face of the negative, refraction commences, and the image on the screen is displaced. It is on this account that I object to the mode of lighting at present employed, which gives rise, even without change in the position of the sun, to unequal refraction from the centre to the circumference, having the effect of deforming the image, and producing confused outlines. I may also add, that in the best conditions in which we can place ourselves, we do not obtain, with substances slightly sensitive, a sharp proof without a heliostat, which rigorously preserves the bundle of rays in the axis of the optical system. With chloride of silver paper, which is sufficiently impressed only at the end of twenty minutes, it is absolutely necessary to employ a heliostat.

Wet negative paper, as now prepared, is sufficiently rapid for obtaining a successful proof, and, by gold toning, yields very harmonious tones.

Enlarging photographic pictures is not, as many suppose, a mere pastime, or curious experiment; on the contrary, it demands much consideration, for it greatly concerns the future of the photographic art; it will doubtless greatly extend its practice, and yield many remarkable results.

Applied to the study of natural history, by the aid of the microscope, the enlarging process admits of the representation, on a very large scale, of invisible creatures, the infinite details of which baffle the skill of the most experienced engravers; and it may possibly solve some interesting questions in physiology; transferred to the domain of art, it cannot fail to be of great service, and to render valuable assistance. Ten years' experience in this direction enables me to point out certain errors, and to indicate a more sure road to those who are now commencing their progress. The stereoscopic pictures of M. Ferrier have attained so high a degree of perfection, as naturally to excite the desire to enlarge them, and yet they retain all their sharpness and detail.

In attentively studying the effects of the instrument which shows them in relief (the stereoscope), I have satisfied myself that the theory of Sir David Brewster, although the only one admissible, does not satisfactorily account for the phenomenon, and I beg leave to complete it by a remark which also applies to the question of enlarging.

Artists justly maintain that photographic proofs are deficient in aerial perspective. Some photographers have attributed this defect to the sensitive film, which they supposed to be more acted upon by the light emanating from distant objects than by that proceeding from those that are nearer; but, in my opinion, this view is wrong, for if the distant landscape sent a greater quantity of light to the eye than the foreground, the sensitive film would represent only the scale of luminous intensity which exists in nature, and cannot be responsible for want of harmony.

Others have maintained that the strongly-marked horizon, in making the distant appear near, renders us bad judges of distance; but the long-sighted see the distances of a landscape as distinctly as the camera represents them, which in no respect interferes with their ideas of distance. There is another reason for this want of harmony. It has been remarked that the more the proofs are enlarged, the more this defect of perspective is apparent. Now, the chemical processes being the same, both for large and small pictures, we must look to optics for an explanation of this defect.

We observe that the more a proof is enlarged, just so much the more, on account of the exigences of optical laws, will the foregrounds be wanting. Now, it is the dimensions, the details, the sharpness of these foregrounds, which determine our idea of extent: isolate these, and we then have no idea of distance. Objectives, which yield images of 20 inches, have a focus of at least 40 inches; so that infinite distance, that is, the nearest limit of sharpness, commences only at 3,500 to 4,000 yards. Everything near is not strictly in focus, and must be almost entirely suppressed in the picture. Distinct view, on the contrary, commences at a very short distance from the eye; it may therefore be readily understood that there cannot be a strict relation between the photographic and the natural landscape, and it is this discord that is the cause of the want of perspective in our landscapes.

By perceiving distinctly the objects forming the foregrounds near to us, we appreciate their true dimensions; and it is by comparing these dimensions with those of similar objects or analogous places in the various planes constantly becoming smaller, that we receive the impression of distance. This is so true, that painters of panoramas never place any objects like those represented in their pictures within sight of the spectators, so that the instinctive comparison between the dimensions of the painted object may not destroy the impression of distance. In a proof of large dimensions, the angle sustained by a house, which, at only 300 yards distance, forms part of the foreground, and that embraced by a house apparently nearly similar, I will imagine, and situated near the horizon, do not differ sufficiently to give us a complete idea of distance. It is only necessary to compare our best photographs with a picture by Canaletti to be convinced of the truth of this assertion.

Without further insisting on this fact, it is evident that the marvellous effect of the stereoscope is due partly to the more natural relation existing between the foreground and the distant planes—a relation which is preserved in the amplification given by the instrument. It is easy to comprehend the immense advantage that would accrue to us in making use (for landscapes) of objectives, of which the distinct view, if it may be so called, commences very close to the eye—that is to say, of lenses with short focus. We may also understand why the effect of the stereoscope is not entirely due to the slightly varying angles under which the two pictures are viewed, but also to the relatively nearer situation of the foregrounds, which, when the images are slightly enlarged, give the same impression, to our eyes, as that which they receive from nature. There is, therefore, under the relation of artistic effect and of truth, an immense advantage in taking our pictures with objectives of short focus, and afterwards considerably enlarging them. The greater the difference between the type and the enlarged proof, the more evident will be the aerial perspective. With a view of solving this problem, I am now making a travelling camera, constructed on a microscopic scale, which, in the hands of the operator, will be a true *eye*, in which distinct view will commence at a few yards distance; it will be only four inches square, and will give images mathematically in focus for every plane in the picture, over a surface of three square inches; and in using it, it will not be necessary to have the least knowledge of optics or of photography. Painters and tourists will be able—without baggage, without soiling their fingers with chemicals, without even looking into this little camera—to bring back from their travels everything within their ken at a few paces distance.

(*To be continued.*)

CELESTIAL PHOTOGRAPHY.*

Photoheliography at the Kew Observatory.—The photoheliograph, an instrument for depicting images of the sun's surface photographically, was erected at the Kew Observatory, at the suggestion of Sir John Herschel, in 1854. The original apparatus has received certain modifications, suggested by experience. In the instrument at present in use, the object glass is $3\frac{4}{10}$ inches in aperture, and 50 inches focal length, but the whole aperture is never used; it is always diminished more or less, and generally to about 2 inches, by a stop placed in front of the object glass. The focal image of the sun at the mean distance is 0·466 inches.

The focal image is not, however, received directly on the sensitive plate, as in the case of lunar and planetary photographs, but is enlarged before it reaches it by means of a secondary combination of lenses (an ordinary Huyghenian eye piece), which enlarges the picture to about 4 inches diameter, thus magnifying the image about eight times linear, and diminishing the intensity of the light 64 times.

The object-glass, constructed by the late Mr. Ross, is specially corrected to insure the coincidence of the visual and chemical foci; but the rays, after passing through the secondary lens, are in some degree dispersed, and this coincidence of foci no longer exists. It required some considerable time to determine exactly the position of the actinic focus; after numerous trials, it was ultimately found that the best photographic definition is obtained when the sensitised plate is placed from $\frac{1}{10}$th to $\frac{1}{8}$th of an inch beyond the visual focus, and that this adjustment must be modified to a slight extent, according as more or less of the aperture of the object-glass is employed.

The difficulties of photoheliography consist principally in the rapidity with which the sun's image acts upon the sensitive film. In lunar and stellar photography, most of the obstacles to be overcome arise from deficiency of photogenic power in the unenlarged focal images of those celestial objects. Even when the brilliancy of the sun's image was considerably lessened by stopping off a large portion of the object-glass, and greatly magnifying the diameter of the image, the pictures were solarised. Recourse was then had to a less sensitive material than wet collodion, as albumen and dry collodion; but the results were not encouraging. The surfaces of these media are rarely sufficiently pure for the delineation of such minute objects as solar spots, and the processes themselves present disadvantages which render them inapplicable to photoheliography. Recourse was again had to the wet collodion process, and a piece of yellow glass interposed between the principal and secondary object-glasses, with the view of diminishing the actinic intensity of the sun's image; still only burnt-up pictures were obtained.

For the successful employment of so sensitive a medium as wet collodion, it became absolutely necessary to contrive some means for reducing the time of its exposure to the sun's action to an extremely small fraction of a second. It was considered that any apparatus placed in front of the object-glass would have the disadvantage of cutting off the aperture by successive non-symmetrical portions, and of yielding an image less perfect than when the exposed portion of the object-glass remained always concentric and circular. On the other hand, it was seen that a slide with a rectangular opening, if made to move across the tube in front of the sensitised plate, would in no respect distort the picture, but would merely stop off a portion of it, and have the effect, as it moved along, of allowing each part of the sun's image to act in succession on different parts of the collodion, and there to record itself; but a rapidly moving object close to the collodion plate is so liable to cause a disturbance of dust, and its consequent deposit on the collodion film, that the carrying out of the idea in this manner was given up.

A successful plan of overcoming these difficulties was suggested by the late director of the Observatory, Mr. Welsh, and carried out by Mr. Beckley. Instead of placing the sliding apparatus close to the collodion plate, he proposed that it should be made on a smaller scale, and fixed as near the plane of the primary focus as possible. The apparatus answers its intended object most perfectly, and the production of the solar picture is now as easy as that of a lunar picture. The sliding plate is very light, and moves so freely, that it does not, while in motion, disturb the telescope in the slightest degree; it is drawn downwards by means of a spring of vulcanised caoutchouc, and, as soon as it is released, it shoots with great rapidity across the field. The sliding plate has two apertures—one circular, and sufficiently large to permit of the passing of all the rays; this is used for the purpose of focussing on the screen, and also in observing contacts of the sun's limb with the wires. The second aperture is square, and is fitted with a sliding piece actuated by a screw, which projects beyond the telescope tube; by means of this screw the aperture may be completely closed, or readily reduced to a slit of any required width, equal to, or smaller than the side of the square opening, a divided scale being affixed to the screw for that purpose.

Previous to taking a picture, the sliding plate is drawn up just so high that an unperforated part of it completely shuts off the sun's image; the plate is held in this position by means of a small thread attached to it at one end, and looped at the other, the loop being passed over a hook on the top of the tube. When the picture is about to be taken, the retaining thread is set on fire, and the rectangular aperture, as soon as the sliding plate becomes released, flashes across the axis of the secondary object-glass, thus allowing the different parts of the sun's image to pass through it in succession, and to depict themselves, after enlargement, successively on the collodion plate. Although the time of exposure is so short as to be scarcely appreciable, yet it is necessary to regulate its duration; and it is therefore controlled by adjusting—1st, the strength of the vulcanised caoutchouc spring; 2nd, the width of the aperture. In practice, the opening is usually varied between $\frac{1}{10}$th and $\frac{1}{20}$th of the diameter of the sun's focal image.

From the preceding description, it must be evident that no driving machinery or clockwork apparatus is necessary, because the photograph is taken in so short a time that no appreciable distortion of the sun's image would result in the interval by allowing the telescope to remain at rest. So rapid is the delineation of the sun's image, that fragments of the limb, optically detached by the "boil" of our atmosphere, are frequently depicted on the collodion, completely separated from the remainder of the sun's disc; more frequently still, from the same cause, the contour of the sun presents an undulating line.

The clockwork, although unnecessary for the daily work of the photoheliograph, may prove of great value on the rare occasions of a total solar eclipse. It is to be hoped that it will enable the contemplated expedition to Spain, on the 18th inst., to obtain a photographic record of the feeble light of the Corona and the Red Flames; although it is by no means certain that their light will be sufficiently intense for that object. Even a failure, however, will prove of some value, for it will show that the images of these phenomena, when enfeebled by an enlargement of eight times linear, possess too little actinic power to imprint their outline on a collodion plate in a given number of seconds; and thus data will be furnished for a future proof. It is desirable that astronomers should endeavour to obtain photographs of these data, by placing the sensitised plate directly in the focus of the telescope.

(*To be continued.*)

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* Continued from vol. iv. p. 99.

SCIENTIFIC GOSSIP.

A suggestion has been made that the applicability of the salts of lithium, for photographic purposes, should be investigated, and a German experimentalist, Dr. Schnauss, has been for some time engaged in this inquiry. A preliminary report is now before us, and from this we think a few facts may be obtained which will interest our readers. Lithium is a light metal, resembling sodium and potassium, only lighter; in fact, it has the reputation of being the lightest solid body in nature: it is very similar in its salts to those of potassium, sodium, and ammonium. The salts which are of most interest to the photographer are the iodide, the bromide, and chloride; these are of about the same solubility in alcohol as the corresponding ammonium salt. The iodide of lithium is easiest to dissolve, and is the salt which the Doctor principally used in his experiments. Collodion, iodised with it, is very sensitive, and does not decompose as it does when it contains potassium or ammonium salts. The collodion soon becomes of a beautiful bright yellow colour, and retains it for some weeks without becoming darker. Lithia compounds are only met with very rarely in nature, and their extraction from the other bodies with which they are associated is a matter of some considerable difficulty. On this account the price is somewhat high. Owing, however, to the fact that lithia compounds are now being used in medicine, several manufacturers are turning their attention to the subject, and they will, in all probability, be soon obtainable at a reasonable price.

An interesting account of a spring of water, perfectly pure, has reached us; it will be accessible to our readers, as it seems to be generally taken for granted, by all photographers and scientific men, that all spring water contains both saline and gaseous impurities, and that rain water, which is never pure, is the nearest approach to chemically pure water. The following account shows that there is at least one spring of which the water is chemically pure, and will doubtless induce a search for other springs of a similar nature. The spring is situated at the head of a small ravine, where a stratum of fifty or sixty feet of fine gravel and sand rests upon a stratum of slate rock of still greater thickness, and which is impervious to water. The water of the spring filters through the gravel and sand till it reaches the rock, where it is forced to take a horizontal direction, and gushes out from between the two strata in a never-failing stream, which, after resting for a moment in a small basin, takes a leap of about five-and-twenty feet over the perpendicular face of the slate rock into another basin at the foot of the fall. The water taken from below the fall is always chemically pure; when tested with blue and red litmus paper, it produces no change in the colour of either. When mixed with solution of nitrate of silver not the slightest change takes place, nor, after standing for some time, does it deposit any precipitate. With baryta salts no reaction takes place. A portion of the water faintly coloured with sulphindigotic acid and boiled did not change colour, which it would have done had nitric acid been present; and lastly, when five gallons of the water were evaporated, they did not leave any solid residue whatever. Carbonic acid was tested for and found absent. Many photographers go to great expense and trouble to obtain distilled water. This, in some cases, is, we think, unnecessary, for if they were to be at the trouble to test the river and spring water in their immediate neighbourhoods, they would frequently, especially if they lived in mountainous regions, find it sufficiently pure for their purpose, although it is not probable that they would often find a spring so pure as this one.

A most important advance has just been made in the science of submarine telegraphy. On Saturday, the 23rd ult., Mr. W. P. Piggott laid, and satisfactorily worked, an experimental cable between Ryde, in the Isle of Wight, and Alverstoke, on the main land, which cable had the remarkable peculiarity of being *uninsulated*, and of having neither india rubber nor gutta percha in its composition.

The British Association met last week at Oxford. The President, Lord Wrottesley, in delivering his inaugural address, alluded to the photoheliograph in use at Kew Observatory, and described in another part of our columns.

In the different sections, photography is dignified with a place in section A, that of mathematical and physical science. Several papers were read in this section, which will be interesting to our readers, one of which, by Mr. Claudet, "On the Principles of the Solar Camera," we publish in the present number. Mr. Claudet also read a valuable paper "On the Means of Increasing the Angle of Binocular Instruments, in order to obtain a Stereoscopic Effect in proportion to their Magnifying Power;" and one was read by Dr. Draper "On a Reflecting Telescope for Celestial Photography, now erecting at Hastings, near New York."

Dictionary of Photography.

Phosphates.—The phosphates are of three kinds: monobasic, bibasic, and tribasic, arising from the combination of bases with monohydrated, bihydrated, and trihydrated phosphoric acid. The alkaline phosphates only are soluble in water, all the other phosphates are insoluble, but they readily dissolve in an acid liquid. They all yield phosphorus when heated to a high temperature with a mixture of carbon, and boric or silicic acid. The most interesting phosphate in photography is the phosphate of soda.

Phosphate of Soda.—The combinations of phosphoric acid with soda are very numerous. The ordinary phosphate of soda of commerce is the tribasic. It is obtained by adding carbonate of soda to an acid solution of phosphate of lime, until neither effervescence nor precipitate manifest themselves. The lime is separated in the state of insoluble subphosphate, and the liquor contains phosphate of soda in solution, which is deposited on evaporation in the form of beautiful transparent oblique rhomboidal crystals. Phosphate of soda consists of $(2\,NaO+HO)\,PhO^5+25\,HO$; that is, of phosphoric acid combined with three equivalents of base:—two equivalents of soda, and one equivalent of basic water.

This salt has a decided alkaline reaction on coloured tests; it is efflorescent in the air; dissolves in two parts of boiling water, and in four parts of cold water. Submitted to the action of heat, it at first melts in its water of crystallisation; it next parts with this water, and if the temperature be not carried too high, it remains in the state of anhydrous tribasic salt. If, however, the temperature is raised, so as to produce igneous fusion, it loses its equivalent of basic water, and becomes $2\,NaO.PhO^5$, pyrophosphate of soda. Phosphate of soda is added to chloride of gold in Mr. Maxwell-Lyte's formula for a toning bath. (*To be continued.*)

A Catechism of Chemistry.

MOLECULAR ATTRACTION—(*continued*).

Q. What is capillary action?

A. Capillary action is the name given to an important result of the existence of adhesion between solids and liquids.

Q. Give an illustration of this action.

A. When a clean glass tube, of a narrow bore, and open at both ends, is immersed perpendicularly in water or other liquid capable of wetting it, so as to leave a portion of the tube projecting above the surface of the liquid, the liquid will be found to rise in the tube considerably above its level outside; and, the narrower the bore of tube, the higher it will rise.

Q. What is this effect due to?

A. To the adjustment of the forces of cohesion and adhesion between solids and liquids under the simultaneous influence of gravity.

Q. In what way do these act?

A. The cause of the rise is, the adhesion between its particles and those of the glass; the limits to that rise are, the action of gravity, and the force of cohesion amongst the liquid particles.

Q. Does this action play any important part in the operations of nature, or in its adaptation to the wants of man?

A. It does. Capillary action influences the circulation of the sap in plants. One of the most familiar illustrations of its employment is in the case of the wicks of candles and lamps. These, being composed of a bundle of fibrous materials, furnish capillary or hair-like channels, by which the oil or melted combustible is elevated to the flame, and supplied as fast as it is consumed.

Q. What is solution?

A. When the force of adhesion between solids and liquids is greater than the power of cohesion between the particles of the solid, the substance is said to dissolve in the liquid. Thus, nitrate of silver or chloride of sodium dissolve in water, resins dissolve in alcohol, silver dissolves in mercury.

Q. How does it happen that bodies dissolve quicker when powdered?

A. Because the act of powdering has partially destroyed the force of cohesion, and has also exposed a much larger extent of surface to the force of adhesion.

Q. Why does a hot solvent dissolve more rapidly than the same liquid when cold?

A. Because heat diminishes the power of cohesion between the particles of a solid.

Q. Are there different kinds of solution?

A. Yes. The cases which have hitherto been considered are cases of simple solution, in which the chemical properties of the bodies are not changed, but only their physical properties. There is another very important case of solution, in which the solid disappears under the influence of a liquid, owing to the exertion of a chemical force between the particles of the two bodies; as, for instance, when silver dissolves in nitric acid.

Q. Can any general rule be traced which governs chemical or mechanical solution?

A. Mechanical solution generally occurs more readily when the solvent and the body dissolved present some general resemblance in properties: thus, mercury dissolves many of the metals, alcohol dissolves resins, oils dissolve fatty bodies and each other. Chemical solution, on the other hand, is most energetic between bodies the properties of which are most widely different: thus, acids dissolve the metals, oils dissolve in alkalies, &c.

Q. In what class does the solution of a salt in water belong?

A. Usually, it is considered that water acts as a mechanical solvent; in some cases, however, it acts as a chemical solvent.

Q. What is meant by a saturated solution?

A. If a solid body is introduced, in successive portions, into a quantity of fluid capable of dissolving it, the first portions rapidly disappear; and, as each succeeding quantity is added, it dissolves more slowly, until, at length, a point is reached when it is no longer dissolved. The force of cohesion between the particles of solid at this stage exactly balances the force of adhesion between the liquid and solid, and the solution is said to be saturated.

Q. What is crystallisation?

A. When a saturated solution is allowed to remain at rest for some time, as the liquid evaporates the solid will separate from it, and, in the act of separating, will assume a certain regular, geometrical form, peculiar to itself. These are called crystals; and the act of so separating out is called crystallisation.

Q. Can crystals be obtained in other ways?

A. Yes. A usual way is, to form a strong solution of the substance in hot water, as most bodies dissolve more freely in hot than in cold liquids. As the liquid cools, the cohesion of the salt resumes its ascendancy, and the crystals separate from the liquid.

Q. Is it necessary that the solid should be dissolved in water or other solvent?

A. No; mere fusion and slow cooling will frequently be sufficient to produce crystals. In this manner beautiful crystals of bismuth or sulphur are formed.

Q. In what manner are they produced?

A. A large quantity (8 or 10lbs.) are fused in a crucible, and allowed to cool very steadily and slowly. When the surface has become solid, a rod of iron is forced through the upper crust, and the still liquid sulphur or bismuth is poured out. The inner surface of the solid portion will then be found to be lined with needle-shaped crystals of sulphur, or brilliant hollow cubes of metallic bismuth.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 2*nd July*, 1860.

MM. Langier and Daussy have, at last, made a report upon a memoir presented to the Academy of Sciences, on the 14th of November last, by M. Laussedat. The paper in question is upon the photographic art as applied to surveying and taking plans, &c. I have already called your attention to this subject when speaking of the great progress realised by M. Porro in the same direction. The report of the two Academicians is, as might have been expected, highly satisfactory, (it has been printed in the *Comptes-Rendus*, vol. l. p. 1127) and shows what immense advantage is gained by photography over the usual methods of surveying, and even over sketches made in the *camera lucida*. I do not see any striking difference between the method employed by M. Laussedat and that already used some time ago by M. Porro, with his *circular camera*, of which I gave a brief description at the time of its invention.

Photographic proofs are infinitely more complete than drawings made with the *camera lucida*, for they omit no details whatever, and give us the true aspect of the ground. They have, moreover, all the advantages of perspective views, and the operations by which one proceeds, in the cabinet, from perspective drawings to the plan of a country, can be effected without difficulty on the photograph. In M. Laussedat's method, as in M. Porro's, the horizontal line, or scale, divided into equal degrees, is printed at the same time as the landscape. The grand point is to fix the camera with great care, and to be assured that, on turning it horizontally to take down different points of the horizon, it moves round a perfectly fixed vertical axis, so that each separate proof obtained preserves rigorously the same horizon.

"The inconvenience," says M. Langier, "of photographic views, consists in their embracing only a limited extent of the panorama; as it is necessary to avoid the distortion produced by the objective, we must restrict the views to 25° or 30°," &c.

But that is exactly what M. Porro has avoided in the construction of his *circular camera*, which, having an immense objective in its centre (a sort of "bull's-eye" glass), takes down the whole of the horizon, north, south, east, and west, in *three* views; whereas with M. Laussedat's apparatus, we should require to take *ten or twelve* views to accomplish the same object!

The Belgian photographer, M. Van Monckhoven, has lately taken in hand again his work entitled "Traité Générale de Photographie," and having carefully revised it, corrected it, enlarged it by bringing it up, as much as possible, to the present state of photography, has republished it, for the third time, under a new title: "Repertoire Générale de Photographie Pratique et Methodique." One of our Parisian papers speaks of this little book as "an immense work of compilation, elucidation, assimilation, and popularisation." It is the first time I ever remarked a French journalist so enthusiastic on the work of a Belgian! But there are few, if any, works on photography written in the French language, putting aside that by M. Sella (who happens to be an *Italian*), which can be compared, for usefulness, with that of M. Van Monckhoven.

M. Georges Pouchet, son of Professor Pouchet, of Rouen, who has lately published an already well-known work on "Spontaneous Generation," writes to the Academy of Sciences on the hand of a negro, an inmate of the hospital *l'Hôtel Dieu*, of Rouen. The palm of this hand, instead of being of a light colour, as is usual with the negro race, is, on the contrary, nearly black. The epidermis of the palm of the hand was eaten away by blisters, applied to cure an abscess, and M. G. Pouchet observed, with attention, the growth of the new skin. It appeared first of a light tint, but in a few days, when it had acquired a certain thickness, turned rapidly black.

No one has studied the black races more than the illustrious Blumenbach. This *savant*, happening to be one day in London, the well-known actor, Kean, was introduced to him; Blumenbach had seen Kean in Shakespeare's tragedy of *Othello*, and Kean wished to know if he had succeeded in imitating the natural type of the African. "You have not only perfectly imitated Nature," answered Blumenbach, "you have actually surpassed her; to imitate the hands of Othello, I saw you put on black gloves, doubtless because you were not aware that in the negro race the palms of the hands are almost white."

M. Sauvageon, of Valence, and M. Bénard, of Havre, have been studying simultaneously the application of electricity to the culture of the silk-worm. The former observer having noticed that his worms became languid after their third moulting, he placed them upon a sheet of iron which stood upon several glass tumblers, serving as isolators, and which communicated with the two poles of a weak Bunsen's battery. As soon as the iron plate had acquired a decided galvanic taste, the grubs became restless and agitated, seeking to avoid contact with the metal by adhering to the mulberry-leaves spread over it. After two minutes of this apparent torture, distributed successively for some days, the silk-worms appeared much better, and spun beautiful cocoons. M. Bénard contents himself with reminding us of the results obtained formerly by the Abbé Bertholon, and by M. Achard, who applied electricity to the eggs of the silk-worm moth, with, it appears, very favourable results; the worms bred under this treatment being larger and more active than those which were not submitted to the electric current, but were placed aside for the sake of comparison.

M. Joly, of Toulouse, writes upon a mule born with two toes upon each of its fore feet. Similar cases have been observed before by M. Joly himself, but they are rare. It results from the present paper—published in the *Comptes-Rendus*, and some former observations, by the same author, published in the *Memoirs of the Academy of Toulouse*—that the feet of the horse tribe must no longer be considered as having one toe (*monodactylous*), but as having two toes fused into one. It results, also, that the singular bone of the horse's leg—called, by the French, the *canon*—is in reality formed of two metacarpian bones fused into one.

M. Daguin has lately observed a halo round the sun. Solar halos are of much rarer occurrence than lunar circles, from the simple reason that the heat of the sun dissolves the little crystals of ice to which the halo owes its existence. The diameter of the halo observed by M. Daguin (on the 31st of May, at Toulouse) varied from 40° 50′ to 43°. Now, the theoretical figure is 22° for the small halo, and 44° to 46° for the large one. M. Babinet attributes these variations, observed by M. Daguin, to the presence of a certain quantity of water formed upon the surface of the crystals by the melting of the ice under the solar influence. The light of this halo was so strongly polarised, that a simple plate of tourmaline extinguished it entirely.

THE BRITISH ASSOCIATION.

To the Editor of the "Photographic News."

Sir,—Among the matters which have come under the notice of the British Association during the last few days, in addition to two papers on photography, read by M. Claudet, were some bearing upon light, including those of Professor Draper, of New York, "On reflecting telescopes for celestial photography now erecting at Hastings, near New York;" and of Sir D. Brewster, "On some optical illusions connected with the inversion of perspective." Decidedly the most attractive communication—in a popular sense—on matters connected with light, was that of Mr. Gladstone, Ph. D., though of no practical utility. It was a paper having for its object to set forth the partial colour blindness of the lecturer, and to introduce a new variety of electric light. Dr. Gladstone, it seems has not the faculty of recognising a particular hue of blueish-green. The Gladstonian electrical light differs from all others in this. It is the light developed from electricity on a mercurial surface, whereas, the electric light has usually been taken from charcoal points. The Gladstonian light is intermittent, and almost totally devoid of the red rays of the spectrum. The flame of alcohol and salt produces a light very similar. At the *conversazione*, given by Oxford to members of the British Association, in the Museum of Geology, that magnificent building was partially illuminated by Dr. Gladstone's light. The ladies will not readily forget the occasion; their complexions assumed a horrible blueish tinge, very much like the complexion of a corpse.

Perhaps the most interesting communication bearing upon light was made by the President, Lord Wrottesley, in his opening address. He stated, that although the larger comets claim, by their grandeur, a larger share of popular notice than the smaller ones, nevertheless these were of greater interest to the philosopher. The little comets have disclosed the remarkable fact that at each successive wandering along the curve of their orbit they approach the sun somewhat nearer than they had previously done. In all probability, therefore, the time will come for them to fall upon the sun, and be merged in his substance. This gradual approach of comets to the sun can only at present be accounted for on the assumption of the existence of an attenuated elastic fluid throughout space; a fluid so attenuated that comparatively heavy bodies like the planets are not affected by it, though comets are impeded in their path. If the centrifugal velocity be impeded, gravitation, of course, takes greater effect; hence the heliocentric approach.

What becomes of these comets when they touch the sun? Are they burnt up? It seems so; and some philosophers speculate on the probability of the assumption that it is with cometary matter that the sun feeds his furnace, and keeps up his stock of life and heat. The student of light will at once perceive that the impeding attenuated elastic fluid can be no less than the ether, the assumed vibrations of which are so necessary to the acceptance and understanding of the undulatory theory of light.

I enclose you the report of the Kew Committee, which will interest many of your readers.—Yours, &c., Δ

Oxford, July 2, 1860.

REPORT OF THE KEW COMMITTEE.

Since the last meeting of the British Association, the self-recording magnetographs have been in constant operation, under the able superintendence of Mr. Chambers, the magnetical assistant. A description of these instruments has been given by Mr. Stewart, the superintendent, in a report which is printed in the Transactions of the British Association for 1859. The drawings for the plates connected with this report were made with much skill by Mr. Beckley, the mechanical assistant at Kew.

It was mentioned in the last report of this Committee, that a set of self-recording magnetic instruments, designed for the first of the Colonial Observatories which have been proposed to Her Majesty's Government, had been completed and set up in a wooden house, near the observatory. Shortly after the meeting at Aberdeen, the chairman received a letter from Dr. P. A. Bergsma, Geographical Engineer for the Dutch possessions in the Indian Archipelago, requesting that the Committee would assist him in procuring a set of self-recording magnetic differential instruments similar to those at Kew, the Dutch Government having resolved to erect such at their Observatory at Java. In consequence of this application, and as the instruments which had been completed were not immediately required for a British observatory, it was resolved that they should be assigned to Dr. Bergsma; this gentleman has since arrived, and has for the last few weeks been engaged at the Observatory in the examination of his instruments.

The usual monthly absolute determinations of the magnetic elements continue to be made.

Application having been made through Padre Secchi, of the Collegio Romano, for a set of magnetic instruments, for both differential and absolute determinations, for the Jesuits' College at Havanna, the whole to cost 600 dollars, or about £150, General Sabine obtained, at a reasonable price, the three magnetometers that had formerly been employed at Sir T. Brisbane's Observatory at Makerstoun, and also an altitude and azimuth instrument. With these instruments it is expected that the application from Havanna Observatory can be met within the sum named; the instruments are now in the hands of the workmen, and will be ready early in July.

Two unifilars, supplied by the late Mr. Jones, for the Dutch Government (one for Dr. Bergsma, and the other for Dr. Buys Ballot), have had their constants determined. Observations have also been made with two 9-inch dip-circles belonging to General

Sabine, which have been repaired by Barrow, and with two dip-circles and a Fox's instrument designed for Dr. Bergsma.

A set of magnetical instruments, consisting of a dip-circle, an azimuth compass, and a unifilar, previously used by Captain Blakiston, have been re-examined, and have been taken by Colonel Smythe, of the Royal Artillery, to the Feejee Islands.

As it was feared that the Kew standard barometer might have been injured by the workmen, who some time since were repairing the Observatory, a new one has been mounted. The mechanical arrangements of this instrument have been completed in a very admirable manner by Mr. Beckley; and the mean of all the observations made, shows that the new barometer reads precisely the same as the old. This result is satisfactory, not only as showing that no change has taken place in the old barometer, but as confirming the accuracy of the late Mr. Welsh's process of constructing these instruments. The height of the cistern of the new barometer above the level of the sea is 33·74 feet.

Mr. Valentine Magrath having quitted the Observatory, at his own request, on the 14th of February last, Mr. George Whipple has taken his place as Meteorological Assistant, and has given much satisfaction. On the 12th of March, Thomas Baker was engaged at the weekly salary of 8s., to be raised to 10s. in six months if he gave satisfaction, which has hitherto been the case.

Since the last meeting of the Association, 173 barometers and 222 thermometers have been verified at the Observatory.

Professor Kupffer, Director of the Russian Magnetical and Meteorological Observatories, visited the Observatory, and was presented with a standard thermometer. Mr. J. C. Jackson, Lieut. Goodal, R.E., and Mr. Francis Galton, have visited the Observatory, and received instructions in the manipulation of instruments.

Mr. Galton has made some experiments at Kew Observatory, to determine the most practicable method of examining sextants, and other instruments for geographical purposes. Considering that these instruments, after having been once adjusted, are liable to two distinct classes of error, the one *constant* for any given reading, and the other *variable*, it is an object to form Tables of Corrections for the constant errors of instruments sent for examination, and also to ascertain the amount of variable errors which might affect their readings. As a groundwork for examination, it is found that small mirrors may be permanently adjusted, at the distance of half a mile, so that when the rays of a mirror of moderate size, standing by the side of an assistant, are flashed upon them, they may re-reflect a brilliant star of solar light, towards the sextant under examination. By having four permanently fixed mirrors of this description, separated by intervals of 20°, 60°, and 40° respectively, and by flashing upon them with two looking-glasses of moderate size, it is possible, by using every combination of these angles, to measure every twentieth degree, from 0° up to 120°. The disturbing effects of parallax are eliminated without difficulty, by mere attention to the way in which the sextant is laid on the table, or, in the case of a zero determination, by a simple calculation. Moreover, the brilliancy of the permanent mirrors is perfectly under control, by the interposition of gauze shades in front of the looking-glasses that flash upon them. This renders an examination of the coloured shades a matter of great ease and certainty. Based upon these principles, Mr. Galton has drawn up a system for the thorough examination of sextants. Each would not occupy more than two hours in having its constant errors tabulated, and its variable errors determined; nor would an outlay of more than £30 be required for the establishment of fixed tables and permanent marks. Difficulty is, however, felt in setting the system in action, owing to the absolute need of an assistant having leisure to undertake it.

The sum of £179 12s. 6d. has been received from the Royal Society, to defray the expense of erecting a model house for the reception of the instruments for Colonial Magnetic Observatories.

The photoheliograph has been an occasional source of occupation to the mechanical assistant; but before daily records of the sun's disc can be obtained, it is absolutely requisite that an assistant should be appointed to aid Mr. Beckley, because his duties are of such a nature as to prevent his devoting attention at fixed periods of the day to an object requiring so much preparation, as is the case with photoheliography. Unfortunately, the funds at the disposal of the Committee are quite inadequate for this purpose; and unless a special grant be obtained, the photoheliograph will remain very little used. At present Mr. Beckley is preparing the instrument, under Mr. De la Rue's direction, for its intended trip to Spain, for the purpose of photographing the eclipse which takes place on July the 18th. The expenses of these preparations, and of the assistants who will accompany Mr. De la Rue, will be defrayed out of the grant of the Royal Society for that object. The requisite preparations are somewhat extensive; for it has been deemed necessary to construct a wooden observatory, and to make a new iron pillar to support the instrument, adapted to the latitude of the proposed station: both the observatory and the iron pillar may be taken to pieces to facilitate their transport. The wooden house is 8 feet 6 inches square, and 7 feet high; it is entirely open at the top, except that portion divided off for a photographic room. The open roof will be covered by canvas when the observatory is not in use; and when in use the canvas will be drawn back, so as to form an outer casing at some little distance from the wall of the photographic room; and, in order to keep this room as cool as possible, the canvas will, in case of need, be kept wetted. The chemicals and chemical apparatus will be packed in duplicate sets, so as to provide, as far as possible, against the contingency of loss, by breakage or otherwise, of a part of them. Mr. Downes, of the firm of Cundall and Downes, of Bond Street, has promised to accompany the expedition; Mr. Beckley will also go; and Mr. De la Rue has engaged Mr. Reynolds to assist in the erection of the observatory in Spain, and in the subsequent photographic operations. The Admiralty, on the representation of the Astronomer Royal, have provided a steam-ship to convey this and other astronomical expeditions to Bilbao and Santander. It is proposed that the Kew party should land at Bilbao, and proceed to Miranda. Mr. Vignoles, who is constructing the Tudela and Bilbao Railway, has kindly promised his aid, and that of his staff of assistants, to promote the objects of the expedition, and promises, on behalf of the contractors, the use of horses and carts for the conveyance of the apparatus. The expedition will sail from Portsmouth on the 7th of July; and, should the weather prove favourable, there is reasonable hope that the various phases of the eclipse will be successfully photographed. Whether the light of the corona and red prominences will be sufficiently bright to impress their images, when magnified to four inches in diameter, is a problem to be solved only by direct experiment.

Prof. W. Thomson (of Glasgow) having expressed a desire that the practical utility of his self-recording electrometer should be tried at Kew, his wish has been acceded to, and the instrument received, and it is expected that it will shortly be in operation under his direction.

A report has been completed by the Superintendent, on the results of the Magnetic Survey of Scotland and the adjacent islands in the years 1857 and 1858, undertaken by the late Mr. Welsh.

Correspondence between General Sabine and the Rev. William Scott, Director of the Sydney Observatory, was read.

The establishment of a Magnetical Observatory at Vancouver Island is postponed, in consequence of the war with China precluding the establishment at present of a corresponding observatory at Pekin. On this subject some correspondence was also read.

The Committee have thought that it might not prove uninteresting to the members of the British Association if, in this report, a short description were given of the Kew Observatory, and of the nature and amount of work which is accomplished therein.

The Observatory is situated in the middle of the old Deer Park, Richmond, Surrey, and is about three-quarters of a mile from the Richmond Railway-station. Its longitude is 0° 18′ 47″ W., and its latitude is 51° 28′ 6″ N. It is built north and south. The repose produced by its complete isolation is eminently favourable to scientific research. In one of the lower rooms a set of self-recording magnetographs, described in the report of the last meeting of this Association, is constantly at work. These instruments, by the aid of photography, furnish a continuous record of the changes which take place in the three magnetic elements, viz., the declination, the horizontal force, and the vertical force. The light used is that of gas, in order to obtain which, pipes have been carried across the Park to the Observatory, at an expense of £250, which sum was generously defrayed by a grant from the Royal Society. Attached to this room is another, of a smaller size, in which the necessary photographic operations connected with magnetography are conducted.

In the storey above the basement, the room by which the visitors enter the Observatory is filled with apparatus. Much of this is the property of the Royal Society, and some of the instruments possess an historical value; for instance, the air-pump used by Boyle, and the convertible pendulum designed by Capt. Kater, and employed by him, and subsequently by General Sabine, in determining the length of the pendulum vibrating seconds. An inner room, which opens from this one, is used as a library and sitting-room, and in it the calculations connected with the work of the Observatory are performed. In this room, dipping-needles and magnets, which it is necessary to preserve from rust, are stored. Here also the MS. of the British Association Catalogue of Stars is preserved. A room to the east of this contains the standard barometers, and the apparatus (described by Mr. Welsh in the Transactions of the Royal Society, vol. 146, p. 507) for verifying and comparing marine barometers with the standard. This room has also accommodation for the marine barometers sent for verification. In the middle of the room is a solid block of masonry, extending through the floor to the ground below. To this an astronomical quadrant was formerly attached; it is now used as a support for the standard barometers. This room contains also a photographic barograph invented by Mr. Francis Ronalds, which, though not at present in operation, may serve as a model for any one who wishes to have an instrument of this description. It is described by Mr. Ronalds in the Report of the British Association for 1851. In a room to the west of the library, thermometers for the Board of Trade, the Admiralty, and opticians, are compared with a standard thermometer, by means of a very simple apparatus devised by the late Mr. Welsh. The Observatory also possesses a dividing-engine by Perreaux, by means of which standard thermometers are graduated. It was purchased by a grant from the Royal Society. In this room the pure water required for photographic processes is obtained by distillation; and here also a small transit telescope is placed for ascertaining time. The transit instrument is erected in a line between two meridian marks—one to the north and the other to the south of the Observatory; so that, by means of suitable openings, either of these marks may be viewed by the telescope.

In a higher storey is the workshop, containing, among other things, a slide-lathe by Whitworth, and a planing-machine by Armstead, both of which were presented to the Kew Observatory by the Royal Society.

In the dome is placed the photoheliograph for obtaining pictures of the sun's disc; attached to the dome there is a small chamber in which the photographic processes connected with the photoheliograph are conducted. This chamber is supplied with water by means of a force-pump. A self recording Robinson's anemometer is also attached to the dome.

In addition to the rooms now specified, there are the private apartments attached to the Observatory.

On the north side of the Observatory there is an apparatus, similar to that used at the Toronto Observatory, for containing the wet and dry bulb, the maximum, and the minimum thermometers.

The model magnetic-house, elsewhere alluded to in this report, stands at a distance of about 60 yards from the Observatory; and the small wooden house, in which the absolute magnetic observations are made, at a distance of about 110 yards. These houses are within a wooden paling, which fences them off from the remainder of the Park, and incloses about one acre of ground attached to the Observatory.

The work done may now be briefly specified. In the first place, the self-recording magnetographs, as already mentioned, are kept in constant operation, and record the changes continually occurring in the magnetic elements. The photographs are sent to General Sabine's establishment at Woolwich, to undergo the processes of measurement and tabulation. In the model magnetic-house there is at present a set of magnetographs which Dr. Bergsma will take to Java. When this set is removed, another will supply its place in readiness for any other observatory, colonial or foreign, at which it may be required. In the house for absolute determinations, monthly values of the declination, dip, and horizontal magnetic force are taken; and magnetic instruments for foreign or colonial observatories have their constants determined. In the meteorological department, all the barometers, thermometers, and hydrometers required by the Board of Trade and the Admiralty have their corrections determined; besides which, similar instruments are verified for opticians. Standard thermometers also are graduated, and daily meteorological observations are made, an abstract of which is published in the *Illustrated London News*. Instruction is also given in the use of instruments to officers in the army or navy, or other scientific men who obtain permission from the Committee. All this amount of work, it is believed, can be executed by the present staff, consisting of the superintendent, three assistants (magnetical, mechanical, and meteorological), and a boy; but the expense attending it is greater than the present income of the Observatory, furnished by the British Association, will support.

In the resolution of the British Association of the 14th September, 1859, it was recommended to Government, at the instance of the Joint Committee of the Royal Society and British Association, that the sum of £350 per annum should be placed at the disposal of the general superintendent of the magnetical observations; this sum was intended to have defrayed the expenses attending the magnetical department of the Observatory, and the observations of the sun's spots. It will be seen, however, from the correspondence contained in an earlier part of this report, that this source of income is not yet available.

June 18, 1860. JOHN P. GASSIOT, Chairman.

PURE SILVER FROM OLD PLATE.—ACTINOMETER.

To the Editor of the "PHOTOGRAPHIC NEWS."

SIR,—M. Soelzel's process for readily obtaining pure silver from old, worn-out, plated utensils of copper, &c., as reported in a recent number of the *Moniteur Scientifique*, to which you have called attention in your last number (for June 29), is no novelty: it forms the subject of an extremely remarkable paper, by Keir, read before the Royal Society on the 20th of May, 1790, and published in the *Philosophical Transactions* for that year. The only difference in the processes is the use of nitrate of soda by M. Soelzel, and that of potash by Keir. This paper of Keir's is an extremely remarkable one, and contains many other things well worthy of re-examination. *Inter alia*, we find there first distinctly noticed the "passive," or, as he calls it, "altered" state of iron, which it assumes under the action of strong nitric acid, and in which it is unattackable by that acid, which has since been more fully investigated by Bracconot (*Annales de Chimie*, lii. 288), by Herschel (*Annales de Chimie*, liv. 89), and, more recently, by Schönbein—a subject which well merits further investigation. REDDE SUUM CUIQUE.

June 30, 1860.

P.S.—The term *actinometer* is applied, by some of your correspondents, to an instrument or instruments for measuring the photographic effect of solar or other light. It may be as well to notice, that the term is already appropriated to an instrument familiar to meteorologists, and employed by them for measuring the direct *heating* effect of the sun's rays, which it does very satisfactorily.

The paper of Mr. Keir, to which our correspondent has been good enough to call our attention, appears to us to merit reproduction:—

EXPERIMENTS AND OBSERVATIONS ON THE DISSOLUTION OF METALS IN ACIDS, AND THEIR PRECIPITATIONS; WITH AN ACCOUNT OF A NEW COMPOUND ACID (MENSTRUUM), USEFUL IN SOME TECHNICAL OPERATIONS OF PARTING METALS. BY JAMES KEIR, ESQ., F.R.S.

In the following paper I intend to relate two sets of experiments, one showing the effects of compounding the vitriolic and nitrous acids in dissolving metals; and the other, describing some curious appearances which occur in the precipitation of silver from its solution in nitrous acid, by iron, and by some other substances.

In a subsequent paper I hope to continue the subject of metallic dissolution and precipitation; first, by adding some experiments on the quantities and kinds of gas produced by dissolving different metals in different acids, under various circumstances; secondly, by submitting certain general propositions which seem deducible from the facts related; and, lastly, by concluding with some reflections, relative to the theory of metallic dissolution and precipitation.

Part I.—*On the effects of compounding the vitriolic and nitrous acids, under various circumstances, upon the dissolution of metals.*

Section I.—On the mixture of oil of vitriol and nitre.

The properties of the several acids in their separate states have been investigated with considerable industry and success; and those of one compound, *aqua regis*, are well known, on account of its frequent use in dissolving gold; yet not only various other combinations of different acids remain to be examined, but also the changes of properties to which these mixed acids are subject, from the difference of circumstances, especially those of concentration, temperature, and of that quality which is called, properly or improperly, phlogistication, are subjects still open for inquiry.

As I shall have frequent occasion to speak of the phlogistication and dephlogistication of acids, I wish to premise, that by these terms I mean only states or qualities of those bodies, but without any theoretical reference.

Thus, vitriolic acid may be said to be phlogisticated by addition of sulphur or other inflammable matter, by which it is converted into sulphureous acid, without determining whether this change be caused by the addition of the supposed principle, phlogiston, as one set of philosophers believe, or, by the action of the added inflammable substance, in drawing from the acid a portion of its aerial principle, by which the sulphur, its other element, is made to predominate, as others have lately maintained. It were much to be wished that we had words totally unconnected with theory; that chemists, who differ from each other in some speculative points, may yet speak the same language, and may relate their facts and observations, without having our attention continually drawn aside from these to the different modes of explanation which have been imagined. But at present we have only the choice of terms, between words derived from the ancient theory, and those which have been lately proposed by the opposer of that theory. In this dilemma, I have preferred the use of the former, not that I wish to show any predilection to either theory, but because that system having long been generally adopted, is understood by all parties, and principally because, by using the words of the old theory, I am at liberty to define them, and to give significations expressive merely of facts, and of the actual state of bodies; whereas the language and theory of the antiphlogistic chemists being interwoven and adapted to each other, the former cannot be divested of its theoretical reference, and therefore seems inapplicable to the mere exposition of facts, but ought to be reserved solely for the explanation of the doctrines from which this language is derived. Thus, by the definition which I have mentioned of phlogistication, this word expresses not the presence or existence of an hypothetical principle of inflammability, but a certain well-known quality of acids and of other bodies, communicated to them by the addition of many actual inflammable substances. Thus nitrous acid acquires a phlogisticated quality by the addition of a little spirit of wine, or by distillation with any inflammable substance.

No two substances are more frequently in the hands of chemists and artists than vitriolic acid and nitre; yet I have found that a mere mixture of these, when much concentrated, possesses properties which neither the vitriolic acid nor the nitrous, of the same degree of concentration, have singly, and which could not easily be deduced, *à priori*, by reasoning from our present knowledge of the theory of chemistry.

Having found, by some previous trials, that a mixture composed of nitre dissolved in oil of vitriol was capable of dissolving silver easily and copiously, while it did not affect copper, iron, lead, regulus of cobalt, gold, and platina, I conceived that it might be useful in some cases of the parting of silver from copper, and the other metals above mentioned; and having also observed that the dissolving process of the mixture of vitriolic and nitrous acids varied greatly in different degrees of concentration and phlogistication, I thought that an investigation of these effects might be a subject fit for philosophical chemistry, and might tend to illustrate the theory of the dissolution of metals in acids. With these views I made the following experiments:—

I put into a long-necked retort, the contents of which, including the neck, were 1,400 grain measures, 100 grain measures of oil of vitriol of the usual density at which it is prepared in England, that is, whose specific gravity is to that of water as 1·844 to 1, and 100 grains of pure and clean nitre, which was then dissolved in the acid by the heat of a water bath. To this mixture 100 grains of standard silver were added; the retort was set in a water bath, in which the water was made to boil, and a pneumatic apparatus was applied to catch any air or gas which might be extricated.

The silver began to dissolve, and the solution became of a purple or violet colour. No air was thrown into the inverted jar, excepting a little of the common air of the retort, by means of the expansion which it suffered from the heat of the water-bath, and from some nitrous fumes which appeared in the retort, and which, having afterwards condensed, occasioned the water to rise along the neck of the retort, and mix with the solution. The remaining silver was then separated and weighed, and it was found that 39 grains had been dissolved, but probably more would have been dissolved if the operation had not been interrupted by the water rushing into the retort.

In the same apparatus 200 grains of standard silver were added to a mixture of 100 grains of nitre, previously dissolved in 200 grain-measures of oil of vitriol; and in this solvent 92 grains of the silver were dissolved, without any production of air or gas. The solution, which was of a violet colour, having been poured out of the retort while warm (for, with so large a proportion of nitre, such mixtures especially after having dissolved silver—are apt to congeal with small degrees of cold), in order to separate the undissolved silver from it, and having been returned into the retort without this silver, I poured 200 grains of water into the retort, upon which a strong effervescence took place between the solution and the water, and 3,100 grain-measures of nitrous gas were thrown into the inverted jar. Upon pouring 200 grains more of water into the retort, 600 grain measures of the same gas were expelled. Further additions of water yielded no more gas; neither did the silver, when afterwards added to this diluted solution, give any sensible effervescence, or suffer a greater loss of weight than two grains.

In the same apparatus, 100 grains of standard silver were exposed to a mixture of 30 grains of nitre dissolved in 200 grain-measures of oil of vitriol; and in this operation 80 grains of silver were dissolved, while, at the same time, 4,500 grain-measures of nitrous gas were thrown into the inverted jar. When the undissolved silver was removed, 200 grains of water were added to the solution, which was of a violet colour; and upon the mixture of the two fluids an effervescence happened, but only a few bubbles of nitrous gas were then expelled.

In the same apparatus, 100 grains of standard silver were exposed to a mixture of 200 grain-measures of oil of vitriol, 200 grains of nitre, and 200 grains of water; and in this operation 20 grains of the silver were dissolved without any sensible emission of air or gas.

In these experiments the copper contained in the standard silver gave a reddish colour to the saline mass which was formed in the solution, and seemed to be a calx of copper interspersed through the salt of silver. I perceived no other difference between the effects of pure and standard silver dissolved in this acid.

I then exposed tin to the same mixture of oil of vitriol and nitre, in the same apparatus, and in the same circumstances, taking care always to add more metal than could be dissolved, that, by weighing the remainder, the quantity capable of being dissolved might be found, as I had done with the experiments in silver, and the results were as follow:—

No tin was dissolved nor calcined by the mixtures in the proportion of 200 grain measures of oil of vitriol to 200 grains of nitre; nor by another mixture in the proportion of 200 grain measures of oil of vitriol to 150 grains of nitre, and, consequently, no gas was produced in either one instance.

With a mixture in the proportion of 200 grain measures of oil of vitriol and 100 grains of nitre, the tin began soon to be acted upon, and to be diffused through the liquor, but no extrication of gas appeared until the digestion had been continued two hours in boiling water, and then it took place and gave a frothy appearance to the mixture, which was of an opaque white colour, from the produce of tin diffused among it. In this experiment, the quantity of tin thus calcined was 73 grains, and the quantity of nitrous gas extricated during this action on the tin was 8,500 grain measures. Then, upon pouring 200 grains of water into the retort, a fresh effervescence took place between the water and the white opaque mass, and 4,600 grain measures of nitrous gas were thrown into the inverted receiver.

With a mixture in the proportion of 100 grain measures of oil of vitriol to 30 grains of nitre, 30 grains of tin were dissolved or calcined, and the nitrous gas which began to be extricated much sooner than in the last-mentioned experiment, with a larger proportion of nitre, amounted to 6,300 grain measures. Water added to this solution of tin did not produce any effervescence.

With a mixture in the proportion of 200 grain measures of oil of vitriol, 200 grains of nitre, and 200 grains of water, 133 grains of tin were acted upon with an effervescence, which took place violently, and produced 6,500 grain measures of nitrous gas.

The several mixtures above mentioned, in different proportions of nitre and oil of vitriol, did, by the help of the heat of the water bath, calcine mercury into a white or greyish powder. Nickel was also partly dissolved and partly calcined by these mixtures. I did not perceive that any other metal was affected by them, excepting that the surfaces of some of them were tarnished.

These mixtures of oil of vitriol and nitre were apt to congeal by cold, those especially which had a large proportion of nitre. Thus, a mixture of 1,000 grain measures of oil of vitriol, and 480 grains of nitre, after having kept fluid several days in a phial not so accurately slogged as to prevent altogether the escape of some white fumes, congealed at the temperature of 55° of Fahrenheit's thermometer, whereas some of the same liquid having been mixed with equal parts of oil of vitriol, did not congeal with a less cold than 45°. The congelation is promoted by exposure to air, by which white fumes rise, and moisture may be absorbed, or by any mode of slight dilution with water.

Dilution of this compound acid, with more or less water, alters considerably its properties with regard to its action on metals. Thus, it has been observed that in its concentrated state it does not act on iron; but, by adding water, it acquires a power of acting on that metal, and with different effect, according to the proportion of water added. Thus, by adding to two measures of the compound acid one measure of water, the liquor is rendered capable of calcining iron, and forming with it a white powder, but without effervescence. With an equal measure of water, effervescence was produced. With a larger proportion of water the iron gave also a brown colour to the liquor, such as phlogisticated nitrous acid acquires from iron, or communicates to a solution of essential vitriol in water.

Dilution with water renders this compound acid capable of dissolving copper and zinc, and probably those other metals which are subject to the action of the dilute vitriolic or nitrous acids.

Section II.—An account of a new process of separating silver from copper.

The properties of this liquor in dissolving silver easily, without acting on copper, have rendered it capable of a very useful application in the arts. Among the manufactures at Birmingham, that of making vessels of silver plated on copper is a very considerable one. In cutting out the rolled plated metal of the required forms and sizes, there are many shreds or scraps, as they are called, unfit for any purpose but the recovery of the metals, by separating them from each other. The easiest and most economical method of parting these two metals, so as not to lose either of them, is an object of some consequence to the manufacturers. For this purpose two modes were practised: one by melting the whole of the mixed metals with lead, and separating them by eliquation and testing; and the second, by dissolving both metals in oil of vitriol, with the help of heat, and by separating the vitriol of copper by dissolving it in water, from the vitriol of silver, which is afterwards to be reduced and purified. In the first of these methods there is considerable waste of lead and copper; and in the second, the quantity of vitriolic acid employed is very great, as much more is dissipated in the form of volatile, vitriolic, or sulphurous acid, than remains in the composition of the two vitriols.

Some years ago I communicated to an artist the method of effecting the separation of silver and copper by means of the above-mentioned compound of vitriolic acid and nitre; and as I am informed that it is now commonly practised by the manufacturers in Birmingham, I have no doubt but it is much more economical, and it is certainly much more easily executed than any of the other methods; for nothing more is required than to put the pieces of plated metal into an earthen-glazed pan; to pour upon them some of the acid liquor, which may be in the proportion of eight or ten pounds of oil of vitriol to one pound of nitre; to stir them about, that the surfaces may be frequently exposed to fresh liquor, and to assist the action by a gentle heat from 100° to 200° of Fahrenheit's scale. When the liquor is nearly saturated the silver is to be precipitated from it by common salt, which forms a *luna cornea*, easily reducible by melting it in a crucible with a sufficient quantity of potash; and lastly by refining the melted silver, if necessary, with a little nitre thrown upon it. In this manner the silver will be obtained sufficiently pure, and the copper will remain unchanged. Otherwise, the silver may be precipitated in its metallic state, by adding to the solution of silver a few of the pieces of copper, and a sufficient quantity of water to enable the liquor to act on the copper.

The property which this acid mixture possesses, of dissolving silver with great facility and in considerable quantity, will probably render it a useful menstruum in the separation of silver from other metals, and as the alchemists have distinguished the peculiar solvent of gold under the title of *aqua regis*, a name sufficiently distinctive, though founded on a fanciful allusion, so, if they had been acquainted with the properties of this compound, they would probably have bestowed on it the appellation of *aqua reginæ*.

(*To be continued.*)

Photographic Notes and Queries.

NITRATE BATH.

Sir,—In the "Photographic News" of June 15th (No. 93), "Oxoniensis" asks "has 'H. R. R.' removed the pine envelope to his bath? and if so, with what results?" I have great pleasure in replying to "Oxoniensis," and in giving him an account how I proceeded to rectify my *abnormal* nitrate bath. In the first place, I exposed the bath for three days in bright sunlight, the stopper being out of the bottle the whole time. I then made a quantitative analysis of the bath, and found it contained 64 grains to the ounce; the next proceeding was to add to the bath half its measure of water; this produced a copious precipitate of iodide of silver, and, before allowing the iodide to subside, I rendered the bath alkaline, by adding some *moist* or freshly-prepared oxide of silver; brisk agitation was employed for some time, and the turbid bath was set aside for a few hours to allow it to become clear by the subsidence of the iodide of silver, which carried with it a large proportion of the organic matter contained in the solution. Being then carefully filtered through double filtering paper, and tested, it was found to be strongly alkaline. To acidify the bath and put it in working order, I made a solution of nitric acid in distilled water (1 per cent. of acid), and as the sample of nitric acid was of low specific gravity, it required one drop of the dilute acid to each ounce of the bath to render it slightly acid. The bath now measures 62 ounces, and yields perfect negatives. I have discarded my pine case, and adopted a water-tight glass bath, and hope in future to be able to preserve my nitrate bath in an efficient state.

H. R. R.

DRYING-BOX FOR PREPARED PLATES.

Sir,—In the last number of the "News" there appeared a letter from your correspondent "F. H. Young," respecting the box for drying prepared plates, as described in my letter of the 1st June, and while acknowledging the inventive genius of your correspondent, I question whether his suggestion will be found to answer in practice, as the plates will, from necessity, retain the moisture by capillary attraction at the lower end, thereby producing the annoyance which it was his object to remove. By the use of blotting paper this is entirely overcome, owing to the absorbent nature of the paper, which entirely removes the superfluous water.

Your correspondent does not understand the object of the yellow glass. It was intended to see when the plates were dry, but which I find impracticable; it may therefore be advantageously done away with, and will also lessen the expense.

Shooter's Hill, July 3, 1860. Thomas Clark.

BLACK TONES IN POSITIVES.

Sir,—"Glasguensis" will not obtain pure black tones from a gold bath: the normal colour produced by that metal is purple, which is modified by the state of neutrality of the salting or sensitising baths. The presence of acid in either of those produces a redness in the proof; so also does ammonia. Free acid or alkali attacks the sizing of the paper, and is otherwise of no advantage whatever. All the baths employed in positive printing should be neutral. Very black tones are yielded by tartrate of silver; the ammonio-nitrate of silver also gives rich black tones, but they become red during the fixing. It is probable that the ink-printing process—either by gallate of iron, or by bichromate of potash will, when perfected, yield blacker tones than that of gold. Chloride of platinum is reputed to yield very black tones, but I have found all these so-called blacks to be tinged more or less with red, blue, or yellow. Charles Martel.

COLOURLESS ALBUMEN.

Sir,—Allow me to call the attention of the readers of the "News" to an improvement in the preparation of albumen, by M. Carl Kœchlin, as recently announced in one of the Continental journals. M. Kœchlin uses the eggs of ducks and geese in the preparation of this article, discarding fowls' eggs altogether. The result is, that he produces an albumen much whiter and more transparent than has been hitherto obtained, and in all respects better suited to photographic purposes. J. D.

TO CORRESPONDENTS.

An Inexperienced.—You will probably obtain certain results by using the protonitrate of iron as a developer, as described in Nos. 91 and 92; or try the following: 40 drachms of water, 10 drachms nitrate of potash, 2 drachms nitrate of silver. When dissolved, add 1 drachm iodide of potassium. Expose the whole to the sun for a few seconds, and then pour it into a solution of acetic sulphate of iron—35 ounces.

Caroline.—The want of transparency in your negative arises from its being imperfectly washed before fixing. The acetic or citric acid in the developing solution left in the collodion decomposes the hyposulphite of soda, and causes a deposit of sulphide of silver on the negative. When the fixing is effected by cyanide of potassium, this result cannot take place.

Q.—It is impossible to answer your query. Put all the small bottles into a glass measure, and cover them with water, so as to wash out all the chloride of gold. You may guess at the strength by the colour; the exact proportion of water to chloride is immaterial; the stronger the solution, the quicker the pictures tone; but slow toning is preferable.

Protonitrate.—One ounce of water at 60° will dissolve 337 grains of protosulphate of iron, or, at 64°, it dissolves 127 grains of nitrate of potash. The simplest way to obtain a saturated solution is to dissolve the salt in hot water; when the solution becomes cold, it is saturated, and many undissolved crystals will be found at the bottom of the solution.

Uranus.—The size of the image on the focussing-screen depends on two things—the focus of your lens, and the distance of the lens from the object. If the focus be short, the image will be smaller, with the lens at the same distance from the object, than if the focus were longer.

Chester, R.—We give the preference to citric acid in the developing solution, for several reasons: 1. The picture develops more gradually than with acetic acid; 2. It is more portable, and cheaper, than acetic acid, in the proportion of 1d. to 5s.

O. P.—The yellow stains on the skin produced by nitric acid may be removed by hydrosulphate of ammonia, to which a little caustic potassa is added, rubbing the spot with a bit of wood or a little sand; afterwards moisten with a little diluted sulphuric acid; the skin becomes quite white.

J. W. M.—However much the formulæ for toning may differ, they have all the same object, that of producing an alkaline solution of chloride of gold. A basic salt of soda is usually preferred for that purpose, be it acetate, borate, carbonate, or phosphate.

Bandon.—Rolling-presses, for photographic purposes, are not made in England. The best French maker is Poirier, 122, Rue Faubourg St. Martin. The prices vary with the size, from 10 × 12 in., 150 francs, to 20½ × 25½ in., 690 francs.

W. W.—Boil your bath for fifteen or twenty minutes in a glass or porcelain vessel, which may be placed, resting on a piece of wood, in a saucepan of boiling water.

Oxygen.—Bladders are cleansed by ablution in weak potash lye, subsequent washings, and drying; if harsh, rub them over with a piece of sponge dipped in sweet oil, and wipe dry.

Photo.—Perhaps your collodion has become too old; try another sample; if that is not the case, it is probably the developer. But are you sure your bath is of the right strength?

Oval.—A rack and pinion are convenient but not indispensable; you can focus with the sliding body. But with the long focus you work with, you could not reach the rack and pinion while focussing.

Ionic.—The positives obtained from waxed-paper negatives are, in our opinion, preferable to those printed from collodion negatives, at least in architectural subjects, and frequently in landscapes also.

A. Cooke.—We have generally found fused nitrate of silver more or less acid. You will require a neutral bath, therefore you must add oxide of silver to the acid bath.

W. W.—What you regard an extravagant price, is only the price of a guarantee of good materials and workmanship. Cheapness is not economy in photography.

S. Saxon.—We have nothing new to communicate on the subject of carbon printing; it seems in a very quiescent state at present.

Camera.—A focus of sixteen inches ought to give you a landscape 12 × 10, and will, if you use an inch stop.

S. T. B.—We cannot undertake to reply privately to correspondents. Your inquiry is answered in reply to "Oval."

Chemicus.—A formula for the preparation of bromide of potassium was given in our last number but one. See letter from Paris correspondent.

Caroline.—The advertisement is evidently a colourable pretence; have nothing to do with it.

B. A.—We have toned a great many proofs by Sella's sulphuring process, and found them, thus far, as permanent as those toned by other processes.

Oxon.—As you have made your bath with fused nitrate of silver, it is probably acid. Correct it with oxide of silver.

J. Knowles.—Nothing better than gutta-percha, if the "fluid" does not dissolve that substance. In that case use cheese glue.

Nemo.—Paper for large positives is prepared in the same manner as for small ones.

G. I. T.—It is best to use a fresh supply of metagelatine for each new batch of plates.

C. B.—Argol is cream of tartar, or bitartrate of potash.

W. W.—Potassium is not potassa; the latter is the oxide of the former.

⁎ All editorial communications should be addressed to Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard, London, E.C.

THE PHOTOGRAPHIC NEWS.

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COLOUR IN ITS RELATION TO PHOTOGRAPHY.*

BY CHARLES MARTEL.

It must be evident that in no sense of the word can the photographer be considered a colourist. The objects he represents, however brilliantly coloured, are reproduced in neutral tints; moreover, as the chemical agencies employed are capricious in their action on the sensitive surface submitted to their influence, the photographer's translation of nature is false in its light, and shade, and chiar-oscuro. The photographer is not even a colourist in the sense in which that term is applied to the engraver, who translates colour into black and white distributed as *tone*. The following Table exhibits the comparative truth of the various translations of colour effected by the engraver and photographer:—

Colours.	In Photography.	In Engraving.
White	White	White
Sky-blue	White	Very light grey
Blue	Light grey	Grey
Indigo	Half-tint	Deep grey
Violet	Light grey	Grey
Red	Half-tint	Grey
Orange	Half-tint	Light grey
Yellow	Deep grey	Very light grey
Green	Black	Half-tint
Black	Black	Black

From this comparison, it will be seen that the photographer and the engraver are in harmony only at the two extremities of the scale; in fact, where there is no colour, but only black and white.

The difficulties of the engraver's art, and the necessity that he should possess something more than mere conventional rules to guide him in translating *colour* by *tone*, may be made strikingly evident by comparing a good engraving of one of Turner's pictures with the picture itself. The engraver's efforts are directed solely to translating colour by tone, and he might construct a scale of greys, varying progressively in intensity from pure white to black; and, by numbering them, refer every hue of colour to its corresponding tone-equivalent on this grey scale. By a mental effort, he views every colour through a neutral medium, which, while it annuls colour as colour, supplies him with its exact equivalent in tone. This process may be made palpable to the eye, by viewing a highly-coloured picture through a piece of smoked glass, or one coloured of a neutral tint. The hues of the colours composing the picture will be all equally modified, only the *general* tone will be lowered several degrees. Thus, white will appear as a light grey.

The general defect in photographic pictures consists in their being too low in tone, or, in certain subjects, in the contrast of black and white being too sudden and violent. They lack *gradation*, an element by which the painter accomplishes so much; but, on the other hand, the photographer has advantages which sometimes turn the scale in his favour; he gives truth in its simplest form, free from the tricks and conventionalities of art, and this, it will be admitted, is a great charm. A photograph of an object is like seeing the reality with our own eyes, and not through those of another person, as in the case of an artistic production. In photography, the drawing is mathematically accurate, and the linear perspective exact; while there are a host of minute details, caprices of nature, which, although evident to the artist's sight, it is beyond the power of his hand to put on canvas: these form the triumphs of photography, and in great measure compensate for its deficiencies.

Various efforts have been made to overcome the unfaithful translation of colour into tone, effected by photography, which is caused by the irregular action of light on the sensitive film. The best expedient consists in placing in front of the objective a piece of thin glass, or gelatine, coloured of a neutral tint, of just sufficient intensity to subdue the brilliancy of the colours belonging to the blue scale, without greatly altering their tone. The effect of this interposition is to equalise the chemical effects of the colours, which it does, without materially retarding the chemical action, or prolonging the exposure. In certain cases, it will be preferable to employ a glass coloured with a hue of violet, such as lavender or lilac, especially when it is desired to modify an excess of red in the colours of the object. In some circumstances, a modifying effect may be obtained by the employment of a diffused coloured light, as in the case of an object in which an excess of blue colour prevails; in such case a diffused red light will produce a retarding effect, and admit of the object being represented in its true chiar-oscuro, or somewhat near it.

While, in portraiture, the photographer is most perplexed and baffled by those colours in the model which produce an excess of white in his proof, in landscape his difficulties are much greater, owing to the extreme contrast existing in the highly photogenic sky and extreme distances with the non-photogenic action of the green foliage and herbage, and the yellowish or reddish hues of the earth and buildings. The photographic result, even under the most favourable circumstances, is generally deficient in harmony. The light parts are too light, while the deep tones are too deep, solid, and opaque. In scenes of this character, partaking of too violent a contrast of light and shade, the employment of the neutral tinted medium will be found highly beneficial. The time of exposure will, of course, be prolonged; but in most cases this will be no disadvantage.

In portrait painting, the most rational method of proceeding, that most in conformity with the principles of science, is to paint the subject, with all the elaboration of chiar-oscuro, in monochrome, in some neutral colour, such as bitumen, or umber, modified with white to produce the necessary gradations of tone; the highest lights being put in with pure white. In a portrait thus *modelled*, the most perfect relief will be obtained, without the eye becoming distracted or misled by the influence of colour. When this perfect result of chiar-oscuro is arrived at, all that will be necessary to complete the picture, so as to resemble nature, is to apply transparent local colours in their proper places, with the modifications resulting from mutual reflections duly represented. Such was the practice of the masters of the Flemish and Dutch schools, whose works are so excellent in truthful chiar-oscuro. Pictures are extant in this state of monochromous chiar-oscuro, before the local colours are applied.

The photographer's products are exactly parallel to these monochromous pictures, and he will show his taste and judgment in employing every resource and appliance to obtain an effect of perfect chiar-oscuro in his works.

It must be remembered that the eye is irresistibly drawn to the strongest light, the focus, in a picture. Now, this focus should always be at the most important point in the picture. In pictures of the "Nativity of Christ," we find this focus of light to be on and around the body of the infant Jesus. In the best portraits of the great masters, as Titian, Rembrandt, Vandyck, and others, the focus of light will be found in and around the centre of interest, the *head;* upon which it is desired that the attention and interest of the spectator should be fixed. It is not meant that all the other portions of the picture should be obscure or indistinct, or unnecessarily sacrificed; they only require to be subdued, so as not to distract the eye from the centre of attraction.

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* Continued from vol. iv. p. 110.

In the early days of photographic portraiture it was the custom to introduce all kinds of puerile accessories, such as pedestals, carved tables, flower-pots, the property-high-backed chair, the folded curtain, &c. This was done in obedience to the teachings of the cheap miniature school of art; fortunately, better taste soon prevailed, and, at the present day, we encounter but few specimens of this style of low art. Still the grand principle of simplicity and centering of interest on the head alone is not so fully recognised as to render these remarks unnecessary.

To the photographer who has not access to the works of the great masters of painting, good engravings are generally accessible; but they must be good, to be of any value as examples. Many engravers, especially those of the modern school, work in utter ignorance of the principles of chiar-oscuro. From a too violent contrast of light and shade, from mistranslating colour as tone at its proper gradation, their works are deficient in harmony, and spotty; what should be light grey is represented as pure white, while deep shadows are represented by opaque black; in this respect, they have all the unavoidable defects of photographs.

It would be invidious to name those photographers whose works have been produced in obedience to high principles of art; but, from what has been stated above, it will not be difficult for the reader to recognise them.

(*To be continued.*)

INSTANTANEOUS PHOTOGRAPHY.*

BY WARREN DE LA RUE, ESQ., F.R.S., ETC.

With the view of facilitating the labours of others desirous of entering the field of (celestial) photography, I will describe, with all necessary minuteness, the process finally adopted, after many trials and failures. I would remark, at the same time, that it is quite impossible to give such directions as will enable another operator to insure perfect results, as this can only be attained by perseverance, long practice, and a strong determination to overcome obstacle after obstacle as it arises; therefore no one need hope for even moderate success if he dabbles in celestial photography in a desultory manner, as with an amusement to be taken up and laid aside.

In order to prosecute celestial photography successfully, there must be, in close contiguity with the telescope, a photographic room, supplied with both common and rain water. The water-taps should project over a sink, so as to reach about a foot from the wall. The rain water is kept in, and filtered by, an ordinary stone-ware filter. The photographic room may be lighted generally by means of an ordinary Argand reading-lamp, over the shade of which hangs a lantern-like curtain made of two thicknesses of deep-yellow calico; but the plate, during the development of the picture, must be illuminated locally by a night-light, before which a yellow screen is placed. The photographic room should be furnished with a stove burning wood or charcoal, which will keep a-light for a long time, in order that its temperature may never fall much below 50° Fahrenheit during the winter.

In my earlier experiments, the positive process was invariably employed on account of its greater rapidity; but so many details, visible by transmitted light in a positive, are lost when it is afterwards viewed by refracted light, that endeavours were made to render the negative process equally rapid. After many trials I succeeded in this, and I now never have recourse to the positive process, except for some special object.

Glass used.—It is, of course, necessary to have the plate somewhat larger then the object to be taken; the size used, when the telescope is employed as a Newtonian, is 2⅜in. by 3⅛in. When the pictures are taken by the direct method, the plates are circular, and 2¾in. in diameter. The outside diameter of the slide to contain the circular plate is 3¼in., the exact size of the cell of the diagonal mirror, so that no more light is stopped out by the plate holder than by the small mirror.

The glass used is the "extra white patent plate," and I have it selected as free from specks and bubbles as possible; but, nevertheless, I have frequently to reject about one-third of those discs which are supplied to me.

Mode of Cleaning the Plate.—The glass is cleaned in the ordinary way by means of tripoli-powder, mixed up with three parts of spirit of wine and one of liquid ammonia to the consistence of cream. For drying the plates I am provided with *two* cloths only, which, in the first instance, have been carefully washed with soda (avoiding the use of soap), and repeatedly rinsed in water. Each time after being used these cloths are thoroughly dried, but they need not be washed for months together. For the final wiping of the plate, a piece of wash-leather is employed, also carefully dried before being used.

A piece of grit-stone, such as is used by mowers to sharpen scythes, must be at hand, for the purpose of grinding the edges of the glass plate, and making scratches on the margin of the two surfaces, in order to cause the more perfect adherence of the collodion.

The plate to be cleaned is placed on a sheet of cartridge paper and rubbed thoroughly, first on one side, then on the other, with a piece of *new* cotton-wool moistened with the tripoli mixture above described. It is then washed in a stream of water, the fingers being used, if necessary, to aid in removing the adhering tripoli. Holding the plate while still wet, and without touching the surface, one edge after the other is rubbed on the grit-stone, the glass imbeds itself in the friable stone, and thus the borders of the two surfaces get scratched and the edge is ground at the same time. After the four borders are so ground, or, if the plate be circular, the whole periphery has been well rubbed, the hands and plate are well washed to remove all grit, and the plate placed edgewise for a few seconds on a marble slab. With dry hands I take up the plate by the edge, being now very careful not to touch the surface with the hand, and wipe it, first with one cloth, then thoroughly dry with the second, and, lastly, rub both surfaces at the same time with the dry wash-leather. I afterwards breathe on each side of the plate to ascertain whether it is clean, wipe off the condensed moisture, and place the plate in a grooved box, with the best surface turned to face a marked end of the box, so as to know on which side to pour the collodion. Proceeding in the above-described manner, I have never any failure attributable to a dirty plate, and can feel certain of obtaining four or five good pictures of the moon out of about seven plates generally used. I am usually, however, provided with one or two dozen cleaned plates, for it is desirable to have a sufficient reserve, and experience has proved that plates so cleaned may be used even after a week, if the box containing them be kept in a dry room.

The Bath.—It is of the utmost importance that the nitrate of silver bath should be in the most sensitive condition; the rapidity of the process appears to depend, in a great measure, on its not being in the slightest degree acid, but as nearly neutral as possible. It is almost needless to add that, for such a refined application of photography as that under consideration, the solution should be kept in glass in preference to gutta percha. The vessel must be carefully covered to exclude dust, and, from time to time, the solution should be filtered through pure filtering paper (Swedish paper). The nitrate of silver used in the preparation of the bath is invariably fused, in my own laboratory, in quantities never exceeding a drachm at one time, the requisite heat being gradually applied, and care being taken not to raise the temperature higher than is necessary to effect the fusion.

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* From the Report of Celestial Photography in England, presented to the British Association for the Promotion of Science, for 1859.

The solution I employ is the ordinary one of thirty grains of nitrate of silver to the ounce of water, with a quarter of a grain of iodide of potassium. In the preparation of a bath, after the mixing of the nitrate of silver, dissolved in a small portion of the water, with the solution of iodide of potassium, it is customary to add the remaining chief bulk of water, which causes an immediate precipitation of iodide of silver, and then to filter the liquid after the lapse of half-an-hour. It is, however, advisable to agitate the solution from time to time, during several hours, before it is filtered; for, unless this be done, the bath does not become thoroughly saturated with iodide of silver, and has a tendency, for some time, to dissolve a portion of the iodide of silver, which first forms in collodion immersed in it.

I avoid adding alcohol or acetic acid to the bath, for these substances impair its sensitiveness. As, after use for a certain time, the bath becomes charged with more or less alcohol and ether, and their products of oxydation, its properties become changed, and a picture cannot be taken with it with sufficient rapidity: when I find this to occur, I discard the bath, and make a fresh one. The bath, in its most sensitive state, usually exhibits a very feeble alkaline reaction with reddened litmus paper; and, if it be found to have a tendency to fog, it is corrected in this way:—A single drop of pure nitric acid is taken on the point of a glass rod, and mixed with a drachm of distilled water; with this diluted acid (1 to 60) I moisten the point of the glass rod, and stir it about well in the bath—which contains about fourteen fluid ounces of solution—and make a trial. If it still fogs, the acidification is repeated; and thus, after several trials, the fault is corrected. It is better to proceed in this manner than to rely on litmus papers as a test for neutrality. The object being to retain the bath in as sensitive a state as possible, the test by light is the only one to be ultimately depended on.

Moist hydrated oxide of silver may be used to bring back a bath, which has become acid by use, to a neutral state, and, by the subsequent careful addition of dilute nitric acid, it may be made to work; but all additions of acetate of soda, carbonate of soda, or acetic acid, are quite inefficacious for correcting a bath that does not work satisfactorily. In order to obtain the extreme point of sensitiveness, the best plan, on the whole, is to make a new bath; the silver being, as is well known, easily recoverable from its solutions, and, in part, by evaporation and crystallisation, as nitrate.

(*To be continued.*)

TRANSFERRING COLLODION NEGATIVES TO WAXED PAPER.*

BY M. TOULOUSE.

Transferring Varnished Negatives.—The method described can, with some exceptions about to be described, be applied to varnished negatives, even after they have been for a long time employed for printing positives; but success is not so constant, especially when they are covered with a thick or brittle varnish, or with a varnish that penetrates the collodion film, and dissolves with it when we attempt to soften it. When the negative has been covered with Soehnée varnish, slightly diluted with alcohol, and which forms a very tenacious and superficial coating, we have invariably succeeded in the transfer. We have even succeeded in removing, by the method already indicated, negatives covered with this varnish without the glass plate having been warmed previous to its extension.

When the varnish has been extended on a warmed glass plate, the transfer cannot be made by the ordinary method, but it must be modified, so as to soften the collodion. Cold water having no action on these negatives, they are exposed to the steam of water contained in porcelain or zinc dishes, and to the vapour of spirits of wine, heated to about 100° Fahrenheit. When the edges of the negative begin to exhibit a softening, it is covered with a piece of moistened paper, which must not be larger than the glass plate, and pressed down gently with the glass triangle; it must be again exposed to the vapour of water, and the triangle applied from time to time, so as to facilitate the penetration of the moisture and the softening of the collodion. If the operation proceeds favourably, at the expiration of about twenty minutes we perceive that the collodion has a tendency to leave the glass all over its surface; then the negative may be removed by following the method described for non-varnished negatives.

If the heat of the water happens to be too great, the varnish resinifies, and becomes white upon cooling; but its transparency may be restored by going over it with a soft brush dipped in alcohol, or by applying a coating of gum arabic. It is a necessary precaution to expose both sides of the glass plate to the heat of the water, otherwise it may crack.

Transferring Collodio-albumen Negatives.—As we do not operate with this process of M. Taupenôt's, our experiments have been limited to a few negatives intrusted to us for the purpose of transfer. At present we are not able to give a perfect method of transferring, but only to point out the results first obtained, in the hope that they may prove useful to operators disposed to encounter the difficulties that remain to be overcome. Our first attempts lead to the conclusion, that the problem can be solved if negatives and time are at command; but the demands upon our time during the summer season do not permit of our pursuing the subject further at present.

In transferring negatives taken by M. Taupenôt's process, we encountered two serious difficulties at starting:—

1. The great tenacity of the collodion on the glass.
2. The remarkable elasticity the collodion exhibits when it is detached from the glass.

After attempting, without satisfactory results, the employment of acids and cyanide of potassium to detach the collodion, we arrived at a better result by employing a strong solution of American potash. The glass plate being placed on a levelling stand, a sufficient quantity of the potash solution is poured on to the middle, just to cover the plate, and no more; it may be extended over the surface by a tuft of cotton wool. In about half-an-hour the collodion will be found sufficiently softened. Then, however, a second difficulty presents itself. If we attempt to remove the potash solution, the collodion follows the inclination given to the plate, running into folds and creases, so that it is impossible to manipulate it: but if the collodion be washed with water containing acetic acid, the dilatation is diminished, and the operation may be continued by following the method prescribed for unvarnished negatives, taking the precaution to moisten the paper with acidulated water; but the extreme dilatibility of the collodion is an almost insuperable obstacle to success.

SCIENTIFIC GOSSIP.

In spite of the improvements which are daily taking place in the different processes on glass, the paper processes possess advantages which must ever make them preferable for some kinds of work. For photometeoric registration, for instance, no process has yet been devised which is at all to be compared, in cleanliness or efficiency, to the waxed-paper process. Were further proof of the value of this process required, it would be found in the fact that the identical waxed-paper process, introduced by Mr. Crookes, in 1855, at the Photo-meteorological Department of the Radcliffe Observatory, is still in perfect operation there, and has lately been introduced into the Kew Observatory, for the purpose of fixing the images of the fluctuations rendered evident by the self-recording magnetographs. During the daily, almost hourly, experience of five years, it is not to be supposed that the operators have adhered strictly to the plan first taught them. Modifications and improvements have been introduced, and, as these may prove useful to some of our readers who have not quite given up paper photography, we add an outline of some of the principal alterations which have been made in the original process. After the plain sheets of paper have been dipped into melted wax, they are removed and slightly drained. In this stage they are drenched in wax, containing far more than will ultimately be required. It is customary to utilise this excess by ironing the waxed paper between several sheets of plain paper, but when enormous quantities are required for a daily supply all the year round, some simplification of this method is advisable. The plan now adopted is to make up a pile, in which eight plain (unwaxed) sheets alternate with one waxed sheet. In this state it is to be placed between hot plates, and subjected to high pressure for several hours, when the mass of paper will be found to be completely permeated with wax. The operation is to be repeated four or five times, and the sheets being separated after cooling, will be ready for iodising. The operation of pressing is best accomplished with the paper not folded, but of the full size, as received from the maker, so that the edges which retain superfluous wax may be cut off and rejected, and the sheets then cut into pieces of the required shape. Piles of half-an-inch in thickness may be done at once in this way, and, by using several series of hot plates, any quantity of paper may be put through the press in one night.

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* Concluded from vol. iv. p. 111.

We hear from America, that during the visit of the Japanese Embassy the photographers have not been idle. At Washington, San Francisco, and New York, our enterprising brethren have availed themselves of every opportunity of practising their captivating art, and the Embassy have been taken, *en masse*, in detail, and grouped in every conceivable manner. In fact, we may say, that during the whole of their tour, wherever daylight fell on a Japanese, some photographer was patiently waiting to bring his camera within range. The Japanese have a high appreciation of the art, and are as pleased as children to see their faces on paper. They sit patient and still, as we have been able to verify by an examination of their portraits. They have also become very skilful photographers themselves, having taken lessons of some of the first American artists; and from what we have heard of the Japanese faculty of successful imitation, photography will, ere long, be as fashionable in Jeddo or Nangasaki as at New York or London.

There is a talk of gold fields in the United Kingdom. A few days ago operations were commenced on the quartz rocks of Merionethshire, and the first blast brought away an immense mass, which is expected to contain a considerable quantity of the precious metal.

In the annual report of the copyright committee of the Society of Arts occurs the following passage:—"Again, in the case of photographs, advantage is taken of the defective state of the law, by making a new negative from a bought copy of the original; and thus, at a trifling expense, and without trouble or artistic merit, the means are procured of indefinitely multiplying positives (*i. e.* copies), which, though inferior to the original, compete with it in the market, and rob the artist of his just reward; in the case of architectural drawings, by inviting a competition of designs, selecting, perhaps, one, but borrowing from the rejected designs important points of originality, without acknowledgment or remuneration." Some of our readers may be glad to hear that the Council of the Society have great hopes of being able to obtain the sanction of Parliament to a bill which has been prepared to remedy these defects.

Architectural Photographic Association. — Photographers should be fully aware that this Association is desirous of obtaining good proofs of interesting architectural subjects: the supply is by no means equal to the demand.

POLARISATION OF THE LIGHT OF THE LUNAR CORONA IN TOTAL ECLIPSES.

The following remarks by Dr. Rubenson, of Upsal, may be found useful to observers of the total eclipse of the 18th inst.:—

Among the phenomena accompanying total eclipses of the sun, the polarisation of the light of the luminous corona, by which the sun is surrounded, certainly merits special study, as it is evidently closely allied with the physical constitution of the sun. Yet, our knowledge of this part of the phenomenon is still very insignificant. There still remains some uncertainty as to the existence of the polarisation, which has been affirmed by some observers, and denied by others; or explained as having its origin in our atmosphere. Thus, Arago, after describing the observations made during the total eclipses of 1842, 1850, and 1851, expresses himself in the following terms:—"A systematic study of the phenomena of polarisation should be expressly recommended to future observers of total eclipses. The observations cited by Arago not including those executed in Sweden, in 1851, by observers of that country, I have thought that a succinct report of them might possess some interest at the present moment, especially as we find there the first attempt at determining the plane of polarisation. A full report of the observations is contained in the Transactions of the Academy of Stockholm: we limit our extracts to those which refer to the polarisation of the lunar corona."

M. Wallmark, whose observations were made at Stroemstad, expressed himself in the following manner:—"To determine whether the light of the corona was polarised or not, I employed Arago's polariscope, in which the entire corona was visible; the latter then appeared everywhere coloured of a uniform hue, which, however, changed immediately the polariscope was turned on its axis. When the principal section of the doubly-refracting prism was placed in one or the other of the two vertical positions, the exterior image was always coloured *green*, and the interior image *red;* the contrary effect took place when the principal section was horizontal. From this I concluded that the plane of polarisation was perpendicular to the horizon. I forgot to examine if the feeble light of the moon was polarised; still, I am persuaded that the polarisation of the lunar disc, if it had taken place, would have attracted my attention. The sun was almost all the time more or less covered with clouds, a circumstance, notwithstanding the inconvenience resulting from it, in observing the eclipse generally, which had, however, the advantage of preventing the polarised light of our atmosphere from mixing with the phenomenon. Thus, notwithstanding every effort, I could not perceive any trace of polarisation in the vicinity of the moon."

M. Angstroem, who observed at Alfoestad, near Wexioe, had arranged the finder of his telescope so as to serve as a polariscope. He replaced the eye-piece by a Nicol's prism, and in front of the lens he placed a double prism of quartz of about an inch in thickness. The apparatus was very sensitive; but the limited field of vision did not permit of the examination of the different portions of the corona. With respect to the polarisation of the corona, M. Angstroem remarks:—"In the polariscope the two halves of the image exhibit one and the same colour, which does not differ from that of the corona, seen through the astronomical object-glass, except in being a little redder." After showing that this red tint could not be attributed to the polarisation of the corona, M. Angstroem arrives at the following conclusion:—"Thus the corona, as a whole, exhibited the properties which characterise non-polarised light, which, however, do not prevent our admitting the existence of a polarisation in the different portions of the corona."

M. Edlund, who repaired to Wernamo, in Smaland, made use of a very sensitive Arago polariscope. With this instrument he examined the corona at four different points; two of which were situated on the vertical line, and the two others on the horizontal line, passing through the centre of the moon. He found that the plane of polarisation was vertical in the first two points, and horizontal in the other two. From this he concluded that the light of the corona was polarised at each point following the ray of the moon passing by that point. He remarks, that this polarisation cannot be attributed to the light of our atmosphere, which, in the vicinity of the sun, is generally endowed with only an extremely feeble polarisation. Besides, the corona was brilliant enough to be seen even before total obscurity began. As to the direction of the plane of polarisation, M. Edlund determined it by turning the analysing prism until the ordinary and extraordinary images respectively exhibited their colours, when a polarised solar ray traversed the polariscope, and the line joining the centres of the images was parallel to the plane of polarisation of the incident light. We perceive that this method supposes a perfect identity between the light of the corona and that of the sun; otherwise, the real plane could not coincide with the observed plane.

This observation of M. Edlund, the only one of the kind that we know of, appears to deserve particular attention. If the result he deduces from it becomes established by other more direct methods, it will be a striking confirmation of the opinion of those who regard the corona as an external atmosphere surrounding the luminous photosphere of the sun. Whatever it be, we have wished to claim the honour for our countrymen of having been the first to attempt an exact determination of the plane of polarisation of the corona.—*Cosmos.*

MR. CLAUDET ON THE STEREOSCOPIC ANGLE.

The following is an abstract of the second paper read by Mr. A. Claudet, F.R.S., before the British Association, to which we alluded last week, "On the Means of Increasing the Angle of Binocular Instruments, in order to obtain a Stereoscopic Effect in proportion to their Magnifying Power":—In a paper on the stereoscope, which Mr. Claudet read before the Society of Arts in the year 1852, alluding to the reduction of the stereoscopic effect produced by opera-glasses on account of their magnifying power, he stated that, in order to correct that defect, it would be necessary to increase the angle of the two perspectives. This he proposed to do by adapting to the object-glasses two sets of reflecting prisms, which, by a greater separation given to the two lines of perspectives, would reflect on the optic axes images taken at a greater angle than the angle of natural vision. Such was the instrument that Mr. Claudet now submitted to the British Association, to prove, as he has always endeavoured to demonstrate in various memoirs, that the binocular angle of stereoscopic pictures must be in proportion to the ultimate size of the pictures of the retina, larger than the natural angle when the images are magnified, and smaller when they are diminished; which, in fact, is nothing more than to give or restore to these images the natural angle at which the objects are seen when we approach them or recede from them. For magnifying or diminishing the size of objects is the same thing as approaching them or receding from them, and in these cases the angles of perspectives cannot be the same. Mr. Claudet showed that, looking at the various rows of persons composing the audience, with the large ends of the opera-glass, all the various rows appeared too close to one another, that there was not between them the space which separates them when we look with the eyes alone; and he showed also that, with the small end, the space appeared considerably exaggerated. But, applying the sets of prisms to the opera-glass in order to increase the angle of the two perspectives, then looking at the audience as before, it appeared that the various rows of persons had between them the natural space expected for the size of the image or for the reduction of the distance of the objects. By applying the two sets of prisms before the eyes without the opera-glass, it was observed, as was to be expected, that the stereoscopic effect was considerably exaggerated, because the binocular angle was increased without magnifying the objects. But looking with the two sets of prisms alone at distant objects, the exaggeration of perspective did not produce an unpleasant effect. It appeared as if we were looking at a small model of the objects brought near the observer. By the same reason, stereoscopic pictures of distant objects (avoiding to include in them near objects) can advantageously be taken at a larger angle than the natural angle, in order to give them the relief of which they are deprived, as much when we look at them with the two eyes, as when we look only with one eye; instead of being a defect, it seems that it is an improvement. In fact, the stereoscope gives us two eyes to see pictures of distant objects.

SPOTS ON THE SUN.

The surface of the sun has lately been invaded by a great number of spots. They are spread over two zones, parallel to the solar equator, in ten or twelve groups, consisting of nearly sixty spots, each surrounded with a single penumbra. Some of these spots are formed by the combination of two or three other spots, comprised in the same penumbra.

M. Chacornac, who for the last twelve years has carefully registered the configuration and dimensions of the spots on the sun, has never before seen them in so great a number.

The present spots change so rapidly, that a few hours suffice to completely modify their configuration. Thus, on the 26th ult., a group of spots suddenly made its appearance, measuring in angular extent one-fifth of the radius of the sun. Since that date, it has undergone great and continual variations. On the 29th, it occupied an angular extent equal to one-fourth the radius of the sun.

To these spots on the sun, a favourable action on terrestrial temperature has generally been attributed. This opinion is submitted to a very delicate test, by the appearance of a great number of spots during the anomalous season now prevailing. It must be remarked, however, that the sun shines on all the earth; and that this test must not be applied to one country only, but to the whole surface of the globe.

The spots on the sun are visible through a piece of smoked glass; a large one is visible on the upper part of its disc, at about one-fourth its diameter. It is no exaggeration to say that this spot is equal in size to one-tenth of that of the sun. On the right, nearer to the middle of the disc, is another, nearly of the same size, but not so brilliant.

The surface of these spots, which appears black, is nevertheless more luminous than platinum in a state of fusion; for a globule of this metal in that state appears red in the light of the sun, and makes a spot, if interposed between the eye and the luminary; nevertheless, it is certain that at the present time the solar light is diminished about one per cent.

While, by some, these spots are considered as favourable to the harvest, there are others, superstitious, perhaps, who regard them as the beginning of the end of the world; for, if the sun shares the fate of many of its peers, the earth will soon produce nothing but mushrooms!

Meteorological registers are anything but encouraging as to the permanence of the solar intensity. It is certain that many stars of the first magnitude, of the small number that are nearest to our system, have become suddenly and rapidly dim, and, finally, entirely extinguished, disappearing from our firmament. There has been nothing equivocal in this case. Nothing in the sky can play the part of a star but a sun equivalent to our own, and the extinction of a sun must be followed by the complete ruin of every species of animal and vegetable that occupies the earth.

Between the extinction of a sun and its plenitude of actinic power, there are all the degrees of activity which constitute its particular life, and there are certain geological facts which can only be explained at the present day by a considerable weakening of the solar light during a very long period of time, such as, for instance, the nature and position of erratic boulders.

On some of the heights which overhang certain valleys of the Jura, we find enormous masses, with sharp angles, which, by their nature, are undoubtedly *débris* from the Alps; they are the remains of ancient glaciers, which can only be explained by a Siberian cold which must have prevailed during a long series of years; for the muddy torrents capable of transporting the blocks do not form themselves usually on so small a scale, and can only move smaller fragments.

We will now consider the photographic part of the subject. At the present time, the sun is undergoing an intense crisis of great rarity; and as nothing in the world can depict itself with greater perfection, on account of the unparalleled intensity of its light, it would be of the utmost interest to photograph the sun every day the sky permits.

Even without a heliostat we may doubtless obtain on collodion proofs of eight inches in diameter, with an instantaneous apparatus. This would suffice for the distribution and size of the spots, but not to depict the roundness of the disc, and that singular wavering produced by the crossing of the faculæ.

Since photography has made such rapid progress, we can, with appropriate instruments, produce its image in all its perfection; and as doubtless its primitive splendour will soon return, and its heat also, we shall be able to view its face, already so famous for its spots, with gratitude, as we shall then be able to attempt new conquests in heliophotography.

The Photographic Tourist.

A TOUR ON THE BORDERS OF DEVON AND CORNWALL.*

After many remarkable stories from my old host and his wife, I retired for the night, and early the following morning went forward to Hatherleigh, about three miles off, where I found all the things safe at the George Inn. At Jacobstow a good view of the picturesque old church may be got from the back window of the Swan; while on the Oakhampton road, about a quarter of a mile up, a fine little stereoscopic effect may be met with in a small foot-bridge and hand-rail, the foliage on each side being in nice keeping. Coming back to Stow, and on the Hatherleigh road, another good stereo. "bit" may be had, in the bridge, the old tree, and the ford, that stretches across the road, with the "indicator," or post, to show the depth of water in heavy floods; and the mill will make an excellent picture. I now made my way by the old Manor House, and over another picturesque run of water, through various lanes, and across a marsh, where another good bridge "bit" may be got. The small brook and bridge "bits" in this portion of the county are not to be excelled in any other part of England. At Monks-Okehampton, close at hand, the church, lately rebuilt, offers a good point, and would photograph well, inside and out. I now retraced my way to Stow, and on to Hatherleigh.

Hatherleigh Church, from the side of the market-house, makes a good "bit;" and a good view may be obtained from the east end of the graveyard. At Hatherleigh, I found a young chemist in the market-place, who understood all about photographs and photographers; he made me some positive collodion, and remarkably good I found it. The panoramic view from Hatherleigh Moor is one of the finest that can be possibly imagined, backed as it is by the fine Dartmoor hills. About a mile from Hatherleigh, on the road to Iddesleigh, is a fine photographic "bit"—an old timbering bridge. Passing this about half a mile, you come to a directing-post which says to "Meeth;" follow this Meeth road about a mile, when you come to a ford of the river Okement, passable for carts and horses, and here you see, about fifty yards to the left, an old "clapper" or wooden bridge, formed by a series of simple planks and side-rails, with wooden tressels, or supports from the river. This is a fine picturesque "bit," and for the stereoscope admirable. These old Devonshire "clappers" are fast disappearing, and in a few years will be like mail coaches—"nowhere." The increase of modern traffic requires wider bridges, and more substantial erections of stone or brick. After getting a capital whole-plate view of the "clapper," and a good stereoscopic ditto, I returned to Hatherleigh. On crossing the moor, I perceived a large quantity of rough stone piled on the rising ground to the right of the road, approaching the town, and found, on inquiry, that it was to be used in the erection of a monument, to the memory of the late Lieut.-Colonel Morris, so distinguished for his bravery during the late war. The monument, to be in the form of an obelisk, with appropriate sculpture in relief, designed and executed by Stevens of Belgravia, who carved the bold and effective statues for the vacant niches in the front of Exeter Cathedral. As evening was now approaching, I was much struck with the remarkable Turner-like effect given to the scene before me by the bright and golden tinge of the setting sun. From the base of the monument, three fine views might be taken—one full in front, one to the extreme right, and another to the extreme left: the front one a subject fine in the extreme; the Dartmoor hills, rising in broken and bold, wavey lines, in the extreme distance; in the middle range, strong and picturesque clumps of wood and trees, dotted here and there with church towers, and old, quaint homesteads; while to the right, the stronger and nearer woods of Passaford and North Lew, with the commanding position of High Hampton, give to this magnificent view peculiar and wonderful relief. The effects on the left, towards Jacobstow and Exbourne, are equally good. The immediate foreground, looking over St. John's Well, from which flows water of remarkable clearness and purity, and to which, in the olden time—

> "Pilgrims came both near and far,
> With bottle and pitcher, cup and jar,
> To drink from the holy well,"

makes up a scene clear and open, with no obstructions or unsightly, awkward "bits" in the way—all as good as could be wished; and the groups of cattle, goats, sheep, and horses, would, in an instantaneous picture, come out with fine and marvellous effect; in short, you might find a scene or two as good, but nothing superior in any part of England.

I now returned to the town, and called on my friend the chemist; and having found his collodion so good, ordered him to prepare me a quantity to take with me, as I went further on. He showed me some pictures that he had—paper and glass—taken by a gentleman living at the little village of Jacobstow; and very clear and beautiful they were, the stereoscopic effects as good as anything of the kind I have seen. Having packed all up, and got my things forwarded by the 'bus to Brandis Corner, I got some verbal guide-book information from my friend the chemist, and followed across the fields, along a by-way under the west end of the church. I found nothing of note till I came to a high level piece of ground, overlooking Sheepwash and Black Torrington; I passed through the former village, and had a look at the church, but found it quite unsuited for a picture; so, proceeding up a long lane to the right, on the road to Black Torrington, I came to a fine subject—an old stone bridge, about a mile from the village, but could merely take note of the same, as the things were at Brandis Corner. I had a look at Black Torrington church, which would make a good picture from the west end. Just as I turned into the road from looking at the church, a young man in a light trap drove leisurely past; when on inquiring the way to Thornberry, he said, "I am going there, and if you like to ride, are perfectly welcome." I thanked him for the offer, and obtained, by one of those remarkable chances that occur at times in this world, a lift at the "right time" to "the right place."

I found on inquiry, that the young man was brother to the landlord at Thornberry Town inn, and as this said inn was the very place I was bound for, all was so far fortunate. About half an hour brought us to Thornberry Town. I arranged to stop at the inn for a couple of days, and got the landlord's son, John, to go over with a donkey butt, to Brandis Corner, for the traps. As the distance was only some four miles, the lad was soon there and back with his "Jerusalem." The landlord and his better half I found a very civil and obliging host and hostess; and their two boys, Dick and Jack, famous guides to any neighbouring spot, and good helps; while the house affords the use of a small parlour, that can be made instantly dark, and an unlimited supply of clear water in the yard—two desirable things for a photographer.

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* Continued from vol. iv. p. 103.

In the kitchen of the New Inn at Thornberry Town (though where the town was I could not discover) I met a couple of "originals," one of whom, Lewis Strong, was a carter, who worked for the Bradford parson, and did a little for himself in the rat-catching way. He was a sort of rural Widdicomb, and had an immense amount of natural humour. I took a capital character-picture of him, with his rat and ferret boxes and group of dogs. In the morning I went off early, with the lad John, to Dipford Mill, about three miles off. I found the mill "no go," as the old picturesque "bit" was demolished some few years back, and replaced by an unpicturesque modern "bit," wholly utilitarian in character, and of course, photographically, useless. Retracing our steps about a couple of gunshots, and turning up the lane to the left, past the guide-post, to Black Torrington, you come upon a blacksmith's shop and cottage to the right. This is a famous subject, and must have arrested the attention of many, as the blacksmith informed me "lots of runabouts had mapped en off." As a stereoscopic picture nothing can be finer; while a little further to the left, and a few yards up the stream, there is a capital stone quarry, that photographs admirably. We returned through a place called Presticott, and got a good view of the tower and west-end of Bradford Church, and then retraced our steps to the New Inn, Thornberry Town.

Now this Thornberry Town amused me amazingly, consisting, as it did, of the public-house, an old cottage at the back, a linhay, an old, dilapidated pound, and the equally dilapidated church, being the first building of the kind in which I ever saw a tuft of hay thrust into the ceiling over the pulpit to keep the wet out! The church makes a fair picture from the extreme right-hand corner of the graveyard, and would make a very good one from the road, taking in the peculiar-looking town and entrance-gate; but here, again, come the disagreeables, in the shape of some unsightly trees, that would well bear removing. The church has a very good specimen of Norman doorway, and would be much improved were the dirt and whitewash scraped away. In the interior are the remains of what at one time has been a most magnificent monument, called the "Sheckett" tomb. It is in a most miserable state, and says but little for the tastes of the various incumbents and churchwardens, who have allowed for years its piecemeal ruin and decay; but I suppose it is the old story—"what's everybody's business is nobody's business." I found the space near the tomb too scanty to allow distance for the camera, so was obliged to content myself with a rough pencil-sketch.

Here let me remark on its advantages, and give photographers a hint of the benefits they would receive, were they to practise rough and bold sketching, the drawing from the object, and round; by that means they would preserve and bring away in their various trips many interesting and effective "bits" that the camera cannot get "a shot at," as the Egremont Arms worthy used to call it. I now went with my landlord's youngest hopeful, John, to Dunsland House, three miles off, the ancient seat of the Bickfords and Cohams; and as the family were not at home, got permission to take a couple of views, and very good pictures they make. I also got a view of the drawing-room, a magnificent apartment, with a highly-decorated ceiling of the time of King Charles, and a fine picture of General Monk, afterwards Earl of Albemarle. Leaving the house by a path on the left, we went to Cookbury, on our way back, and got a good view of the old-fashioned church, with its quaint pent-house top, from the west, and another of the porch and avenue of old trees, with a good stereo. of the old public-house in the corner. We now returned to Thornberry Town, where I found the rat-catcher amusing himself with some beer-hot. He offered me a glass, and was rather surprised when I told him that I was no pledged teetotaller, yet had not drank beer or spirits for the last sixteen years. At this his facial expression of incredulity and amazement was truly Listonian.

After developing the day's pictures, which all, save one, came out quite satisfactorily, I cleaned up, ready for the morning, when I had made arrangements to start by times, accompanied by handy young John. J. G. F.

(*To be continued.*)

Critical Notices.

Stereoscopic Views of the Interior of Westminster Abbey. By V. A. Prout.*

Westminster Abbey possesses a hallowed interest to the mind of every Englishman, whilst it is no less an object of historic interest to the intelligent of other nations. A series of stereoscopic views of the most interesting objects and points of view of the interior, has strong claims upon public attention. The task of obtaining them is one of no ordinary difficulty, owing to the deficiency of light, and is one that has become only recently possible. The progressive improvements in the photographic art have put us in possession of many things that were once thought unattainable, and none among them that could be more welcome or highly prized than views in the ancient Abbey of Westminster. A dozen of these stereographs are now before us. They consist of—1. *The Nave, from the West Door looking East*, showing the monument to Sir Isaac Newton, that of James, Earl of Stanhope (1720), and the New Gothic Screen; this view exhibits a pleasing distribution of light and shade, and the chiar-oscuro also is good. 2. *South Aisle of the Nave from the South Transept, looking West.* The flood of light streaming in through the southern windows, gives a fine Rembrandtish effect. 3. *North Aisle of the Nave, from the South Transept, looking West*, is a picture of the dioramic class, exceedingly effective, but not so much so as—4. *North Aisle, looking East*, with the chapel of St. Paul in the distance. 5. *The Choir, taken from the Altar, looking West*, which, we think, would have been better if it had been taken when the sun was shining through the western window instead of the southern; in the present view there is too great a contrast of light and shade. 6. *Henry the Seventh's Chapel, looking East*, with the tomb of Henry VII. and his wife, and that of Villiers, Duke of Buckingham, favourite of Charles I. 7. *Henry the Seventh's Chapel, looking West*, with the chantry of Henry V. in the distance. 8. *Tomb of Queen Philippa, Queen of Edward III.* 9. *Monument of Mary Stuart, Queen of Scots*, a striking view, very difficult of execution. The next are subjects of more recent interest. 10. *The Monument to the memory of James Watt* is, in point of chiar-oscuro, the best of the series; a fine harmony of tone, free from harsh contrasts of light and shade, being most conspicuous. 11. Is the *Monument to the Duke de Montpensier, brother to Louis Philippe*, in Henry the Seventh's Chapel. This view being taken at an unsuitable hour of the day, is deficient in relief. 12. *Gibson's Statue of the late Sir Robert Peel* forms a striking subject. Had the point of view been slightly changed, the window over the head of the statue might have been made less obtrusive. But the difficulties of photographing in so cramped a space as the aisles of the Abbey are very great, and the artist must be greatly perplexed to find elbow-room. Upon the whole, we may pronounce these results very successful, and they doubtless might have been much more so, had the most suitable hours of the day, with respect to the direction of light, been chosen.

Dictionary of Photography.

Phosphate of Silver.—A combination of oxide of silver and ordinary phosphoric acid, obtained by adding a neutral solution of nitrate of silver to an (alkaline) solution of phosphoric acid, a yellow precipitate of phosphate of silver is thrown down, which consists of three equivalents of oxide of silver united to one equivalent of phosphoric acid. Mr. Maxwell-Lyte has given a formula for positive printing, founded upon the sensibility of phosphate of silver to the action of light.

Phosphoric Acid.—Phosphorus unites with oxygen, forming oxides and acids. When phosphorus is burned in oxygen gas, or in the open air, thick white fumes are given off, which are deposited under the form of a white powder, which quickly attracts moisture from the atmosphere. This substance is phosphoric acid. When thrown into water, it makes a noise similar to that produced by immersing hot iron, and much heat is disengaged when anhydrous phosphoric acid combines with water. There are three hydrates of phosphoric acid, each of which gives rise to a series of peculiar salts, presenting very distinct properties.

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Phosphoric acid is a very powerful acid, less energetic, however, at ordinary temperatures than sulphuric acid, but as it is much more fixed, it always drives out the latter from its combinations when their temperature is raised sufficiently high.

Phosphoric acid has an intensely sour taste; it is not corrosive to organised structures, even when in a concentrated state. It forms salts with alkalies, earths, and metallic oxides.

PHOSPHORUS.—A metalloid, which can be obtained in three different conditions—solid, liquid, and gaseous. At the ordinary temperature of summer, phosphorus is as soft and flexible as wax; at the temperature of melting ice it is hard and brittle. It cannot be obtained in the crystalline state by fusion, because it passes gradually from the liquid to the solid state, but it can be obtained in the form of rhomboidal crystals, when its solution in sulphide of carbon is slowly evaporated at ordinary temperatures. Phosphorus, when pure, is nearly colourless and translucent, generally of a light yellow tint, which becomes red when it is exposed to the sun's rays *in vacuo*. Its specific gravity is 1·77. It melts at 112° F., and boils at 554°. It is insoluble in water, but soluble in the fixed and volatile oils, sulphide of carbon, alcohol, ether, naphtha, &c. It is very inflammable, taking fire upon slight friction. When exposed in closed vessels to a temperature of about 480° F., it undergoes a very remarkable isomeric transformation, exhibiting properties entirely different from those manifested by ordinary phosphorus. Submitted to a temperature of 480° F., it does not liquefy in the ordinary state. It loses its luminous and waxy character, and becomes brittle and metallic in appearance; it is not so combustible or fusible, and only becomes luminous upon being heated to 392° F., and is unchanged in the air; it has no perceptible odour at ordinary temperatures. It no longer combines with sulphur, even at the melting point of the latter, while ordinary phosphorus, slightly heated in contact with sulphur, combines with explosion. At 500° it returns to the state of ordinary phosphorus. Still the chemical identity of the particles composing these two modifications is proved by the absolute identity of the compounds they produce.

The power of phosphorus as a reducing agent has been turned to account in photography.

PHOTOGALVANOGRAPHY.—A process in which the photographic image is received upon a surface of gelatine, rendered sensitive by bichromate of potass, from which a mould is taken, and from this a copper-plate, by the electrotype process, is obtained, from which impressions, intended to be *fac-similes* of the photograph, are printed. The process is ingenious, but complex and tedious, requiring some four weeks for its completion.

PHOTOGEN.—This term is applied to an inflammable compound, which burns with the emission of much light, by which photographic pictures are taken. The compound is burned in a suitable lanthorn, provided with a pipe for carrying off the noxious fumes generated during combustion.

PHOTOGENIC.—A photogenic material or substance, is one that is readily acted upon by the agency of light, as iodide of silver, chloride of silver, &c.

(*To be continued.*)

A Catechism of Chemistry.

MOLECULAR ATTRACTION—(*continued*).

Q. Do all bodies crystallise in the same forms?

A. No; they assume very different forms, according to their chemical composition.

Q. Are these different shapes reduced to any law?

A. They are; and the study of these laws, or crystallography, constitutes one of the most abstruse departments of chemical physics.

Q. How are crystalline forms subdivided?

A. Into six classes.

Q. What are the names of these classes?

A. 1. The *regular* or *cubic* system, of which alum is a common example.

2. The *right square prismatic* or *pyramidal*, of which ferrocyanide of potassium is a common example.

3. The *rhombohedral* system, to which ice and quartz belong.

4. The *prismatic* system, to which nitrate of potassa belongs.

5. The *oblique* system, of which sulphate of iron is a familiar instance.

6. The *doubly oblique* system, to which sulphate of copper belongs.

Q. Is the phenomenon of crystallisation of any practical use?

A. It is put to the greatest use by photographers and chemists, as affording the readiest means of purifying a salt from soluble or insoluble impurities.

Q. In what manner is this accomplished?

A. The salt to be purified, which we will consider to be nitrate of silver, is dissolved in pure distilled water to saturation. The solution is then to be filtered, and placed in a wide, shallow porcelain basin in a warm place, care being taken to cover it over with a piece of bibulous paper, to prevent the solution being contaminated with dust. In the course of a few hours, depending upon the temperature of the room, and the rapidity of the evaporation, large tabular crystals of pure nitrate of silver will be deposited. The mother-liquor must then be poured off, and the crystals drained on a glass funnel. The solution will, by further evaporation, deposit a further crop of crystals, but these will not be likely to be so pure as the first crop.

Q. What is meant by *isomorphism?*

A. Isomorphous is the term applied to bodies which crystallise in the same forms. It is usually limited to those substances which not only assume the same crystalline form, but have some similarity in chemical composition.

Q. Give some illustrations of isomorphous bodies.

A. The different varieties of alums are very common illustrations of this property of isomorphism. Alum has a composition of $Al_2O_3.3SO_3$, $KOSO_3$, together with water of crystallisation. The sesquioxide Al_2O_3, may be replaced by other sesquioxides, such as of iron Fe_2O_3, or of chromium Cr_2O_3, without the crystalline form being altered. The protoxide KO, may also be replaced by some other similar oxides, and the acid SO_3 may even be in part or wholly replaced by selenic acid, without alteration in the crystalline form.

Q. Can these different alums be separated by crystallisation?

A. They cannot. Indeed, they will crystallise on each other. Thus, if a large and perfect crystal of common alum be placed in a saturated solution of iron alum, it will increase in size regularly. If it be now removed from the solution of iron alum, and be placed in one of chrome alum, it will also increase in size, and in this manner a crystal can be built up of successive layers of different metallic alums. If the crystal be now transferred to the original solution of alum, a fresh layer of colourless salt will be deposited on the green coating of chrome alum.

Q. What is *dimorphism?*

A. Some elementary and compound substances are capable of crystallising in two dissimilar forms, according to the temperature, or other circumstances attending their deposition. They are then said to be dimorphous.

Q. Give an illustration of dimorphous bodies.

A. Sulphur is capable of crystallising in the fourth or prismatic system, and is thus found in nature, or when crystallised from its solution in bisulphide of carbon. When, however, it is crystallised as described in our last number, by fusion and slow cooling, it assumes the form of the fifth, or oblique system. Carbon, as it occurs in the diamond, crystallises in the first or regular system; but in the form of graphite, it crystallises in the third or rhombohedral system.

Q. Do bodies crystallise in more than two forms?

A. Yes; some are trimorphous, such as sulphate of zinc, which crystallises in three different systems.

Q. What is meant by the term *allotropy?*

A. Allotropy is a term applied to a curious property which some elements possess of entirely altering their physical appearances, and becoming to all outward appearances something else. Phosphorus is a curious example of this property. As usually met with, it is a transparent, flexible, waxy-looking body, fusible and inflammable at a comparatively low temperature. By suitable processes, it can be prepared in the form of a dark red powder, which may be exposed to the air without any danger of taking fire, and which differs from common phosphorus in important respects as to its fusibility, specific gravity, solubility, &c.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, *9th July*, 1860.

In our opera houses it is usual to designate the principal singers and performers as *premier tenor*, *deuxième tenor*, *premier violon*, and so on. A similar custom appears to have come into vogue at the photographic establishments. Thus, in the *ateliers* of MM. Bisson, M. Millet, &c., we find a *premier tireur*, a *deuxième tireur*, &c; the word "tireur" signifying a person who takes a photographic proof. Now, the *premier tireur* in M. Millet's establishment happens to be a M. Didier, who, no doubt, has taken this honourable position from his being able to produce a photographic proof that will have as great an effect upon the Parisian public as the *ut dièze* (C sharp) of some renowned *tenor robusto !* But M. Didier does more: he washes his proofs thoroughly, and, at the same time, collects all his silver residues. He has been kind enough to publish his process, which I give you in his own *notes*:—"Take a *cuvette* or basin which is deeper than the width of your widest paper; plunge your proofs into this vertically; no air bubbles will trouble you, and the destructive elements of the photograph will be soon detached from the paper. Place a tap at about half-an-inch from the bottom of the *cuvette*, where the richest silver residues collect. If you apply the same system in fixing and toning, you will never produce discoloured proofs, and it will never be necessary to give any motion to the baths."

Such is the *premier tireur's* warbling. Those who have an "ear" for photography will perceive that the above arrangement is intended for running off a few inches of liquid from the bottom of the bath as soon as a certain quantity of silver salts, &c., have there accumulated.

I can hardly believe a statement recently made by M. Verrier, an amateur photographer, who, according to the *Cosmos*, has hit upon a method of fixing and toning which would appear to do away with the use of salts of gold. The proofs are fixed *in a bath of hyposulphite at* 3 *per cent.*, *to which are added* 3 *or* 4 *drops of sulphuric acid for every* 80 *or* 100 *grammes of water*. The toning, by the same process, is not, at first, so easily performed as with solution of gold; but, says the paper quoted, with a little patience and perseverance, we are enabled to substitute this solution for salts of gold completely.

Now, the sulphuric acid would decompose the hyposulphite of soda, producing sulphate of soda and hyposulphuric acid. But the latter, as soon as it is set at liberty, decomposes into sulphurous acid and *sulphur;* and, according to MM. Davanne and Girard, sulphur is one of the most destructive elements in the photographer's laboratory. In the fixing and toning bath used by M. Verrier, the hyposulphuric acid displaced by the sulphuric acid may immediately combine with some other base on the paper, or in the liquid, and the addition of a few drops of sulphuric acid to this diluted liquid may not have the effect of transforming the "hypo." into sulphurous acid and sulphur, but may only render the hypo-bath far *more sensitive* than usual.

The solution even of a small quantity of platinum in nitro-muriatic acid, is not only a very tedious and disagreeable operation, but is also accompanied with a considerable loss of the metal, from 1 to 6 per cent., in consequence of the formation of a grey pulverulent residue insoluble in *aqua regia*. This residue consists of a double chloride of platinum and potassium, silicic acid (proceeding from the sides of the vessels in which the solution is made), but principally of osmide of iridium.

This operation becomes much more easy and rapid, without giving rise to any residue, if the *aqua regia* is made to act upon the platinum under a certain pressure. We can realise this condition with the greatest facility by the following arrangement.

The retort containing the platinum and *aqua regia* is joined hermetically to a tubulated receiver. A glass tube, as long as possible, is adapted hermetically to the tube of the receiver; it is twice bent at right angles, and the longest branch is plunged for about a yard into a deep jar, or into another larger glass tube, closed at the end, which is filled with water. The gas, to become disengaged, is compelled to overcome the pressure of a column of fluid 36 to 40 inches in height, and this pressure is sufficient to accelerate and favour in the most effectual manner the solvent action of *aqua regia* on platinum.

M. Dufour, of Geneva, has invited the attention of the Academy of Sciences to a fluorescent solution, the most brilliant of any, perhaps, and the easiest to prepare. It is obtained by partially dissolving in water some twigs or pieces of the bark of the flowering ash, *Fraxinus ornus*. As occurs with the bark of the chestnut, we immediately see blue floculi appear, and the liquor soon becomes entirely fluorescent, more so even than the acid solution of sulphate of quinine. By the light of the electric arc, or by the rays passing through a well-selected violet glass, or by any other light rich in chemical rays, it engenders a luminous wave, very intense in fluorescent light.

M. Hunerbein proposes a method of extracting carbonic acid and other deleterious gases from deep mines. He lets down a large vessel containing zinc and iron filings, with strong hydrochloric or sulphuric acid. The hydrogen evolved finds its way out by its lightness, and thus determines a current of air, which drives out all the other gases. This is about the most expensive system of ventilation I ever heard of. I have no doubt that Dr. Van Hecke's valuable system of ventilation, which I mentioned to you some time ago, as having become popular in France and Belgium, could be applied to mines with the same success it has met with in hospitals, and other large buildings.

Dr. Bischof, of Coblentz, writes upon the use of *cachou*, to prevent incrustations in boilers. Cachou, which consists essentially of tannic acid, has been used for this purpose, with satisfactory results, in Prussia. Thus at Saarbruck, it is employed to the extent of 0·16 to 0·55 of one pound of cachou to 100 cubic feet of water, according to the nature of the latter. M. Bischof proves in his paper that there is a certain economy in the use of this substance, and shows that, to clean out a boiler after cachou had been mixed with the water, four days were sufficient, and the expense amounted to two thalers; when no cachou was used, eight days were required to do the same work, and the expense was upwards of three thalers.

KEIR'S EXPERIMENTS ON THE SOLUTION OF METALS IN ACIDS.

EXPERIMENTS AND OBSERVATIONS ON THE DISSOLUTION OF METALS IN ACIDS, AND THEIR PRECIPITATIONS; WITH AN ACCOUNT OF A NEW COMPOUND ACID (MENSTRUUM), USEFUL IN SOME TECHNICAL OPERATIONS OF PARTING METALS. BY JAMES KEIR, ESQ., F.R.S.*

Section III.—The change of properties communicated to the mixture of vitriolic and nitrous acids by phlogistication.

The above-described compound acid may be phlogisticated in different methods, of which I shall mention three.

1st. By dissolving the compound acid with sulphur, by means of the heat of a water-bath, the liquor dissolves the sulphur with effervescence, loses its property of yielding white fumes, and if the quantity of sulphur be sufficient, and if the heat applied be long enough continued, it exhibits red nitrous vapours, and assumes a violet colour.

2ndly. If, instead of dissolving nitre in concentrated vitriolic acid, this acid be impregnated with nitrous gas, or with nitrous vapour, by making this gas or vapour pass into the acid, this compound will be phlogisticated, as it contains not the entire nitrous acid, but only its phlogisticated part or element, the nitrous gas, without the proportion of pure air necessary to constitute an acid. This congregation of oil of vitriol with nitrous gas, or nitrous vapour, was first described, and some of the properties of the impregnated liquor noticed, by Dr. Priestley. (See Experiments and Observations on Air, vol. iii. pp. 129 and 217.)

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* Continued from vol. iv. p. 120.

3rdly. By substituting nitrous ammoniac instead of nitre in the mixture with oil of vitriol.

The compound prepared by any of these methods, but especially by the first and second, differs considerably in its properties, with regard to its action on metals, from the acid described in the first section. It has been observed that the latter compound has little action on any metals but silver, tin, mercury, and nickel. On the other hand, the phlogisticated compound not only acts on these but also on several others. It forms with iron a beautiful rose-coloured solution, without application of any artificial heat; and in time a rose-coloured saline precipitate is deposited, which is soluble in water with considerable effervescence. It dissolves copper, and acquires from this metal, and also from regulus of *cobalt*, *zinc*, and *lead*, pretty deep violet tinges. Bismuth and regulus of antimony were also attacked by this phlogisticated acid.

To ascertain more exactly the effects of this phlogisticated acid on some metals, I made the following experiments with a liquor prepared by making nitrous gas pass through oil of vitriol during a considerable time:—

To 200 grain measures of the oil of vitriol impregnated with nitrous gas, put into a retort with a long neck, the capacity of which, including the neck, was 1,150 grain measures, I added 144 grains of standard silver, and immersed the mouth of the retort in water, under an inverted jar filled with water, to catch the gas that might be extricated.

The acid began to dissolve the silver with effervescence, by application of heat; the solution became of a violet colour, and the quantity of nitrous gas received in the inverted jar was 4,700 grain measures. Upon weighing the silver remaining, the quantity which had been dissolved was found to be 70 grains. When water was added to the solution an effervescence appeared, but only a very small quantity of gas was extricated. By means of the water a white saline powder of silver, soluble in a larger quantity of water, was precipitated from the solution. The solution of silver, when saturated and undiluted, congeals readily in cool temperatures, and when diluted to a certain degree with water gives foliated crystals.

In the same apparatus, and in the same manner, 100 grain measures of this impregnated oil of vitriol were applied to iron. An effervescence appeared without application of heat; the surface of the iron acquired a beautiful rose colour or redness, mixed with purple; and this colour gradually pervaded the whole liquor, but disappeared on keeping the retort some time in hot water. Notwithstanding a considerable apparent effervescence, the quantity of air expelled into the inverted jar was only 400 grain measures, of which one-quarter was nitrous and the rest phlogisticated. The solution was then poured out of the retort, and the iron was found to have lost only two grains in weight. The solution was returned into the retort without the iron, and 200 grains of water were added to it; upon which a white powder was immediately precipitated, which re-dissolved with great effervescence. When 2,000 grain measures of nitrous gas had been expelled into the inverted jar without application of heat, the retort was placed in the water-bath, the heat of which rendered the effervescence so strong that the liquor boiled over the neck of the retort, so that the quantity of gas extricated could not be ascertained.

In the same manner 11 grains of copper were dissolved in 100 grain measures of impregnated oil of vitriol. The solution was of deep violet colour, and at last was turbid. The quantity of nitrous gas expelled into the inverted jar during the operation was 4,700 grain measures. When the copper was removed, and 200 grains of water were added to the solution, an effervescence took place; 1,700 grain measures of nitrous gas were expelled, and the solution then acquired a blue colour.

In the same apparatus and manner 100 grain measures of the impregnated oil of vitriol were applied to tin, which was thereby diminished in weight 16 grains, while the liquor acquired a violet colour, became turbid by the suspension of the calx of tin, and a quantity of nitrous gas was thrown into the inverted receiver equal to 4,100 grain measures, without application of heat, and another quantity equal to 4,900 grain measures, after the retort was put into the water-bath.

Mercury, added to the impregnated oil of vitriol, formed a thick, white, turbid liquor, which was rendered clean by addition of unimpregnated oil of vitriol. In a little time this mixture, continuing to act on the remaining mercury, acquired a purple colour. The mercury acted upon sunk to the bottom of the glass in the form of a white powder; and the purple liquor, when mixed with a solution of common salt in water, gave no appearance of its containing any mercury in a dissolved state.

The nitrous gas with which the oil of vitriol is impregnated shows no disposition to quit the acid by exposure to air; but, on adding water to the impregnated acid, the gas is expelled suddenly with great effervescence, and with red fumes, in consequence of its mixture with the atmospherical air.

Upon adding 240 grains of water to 60-grain measures of impregnated oil of vitriol, 2,300 grains of nitrous gas were thrown into the receiver; but as the action of the two liquors is instantaneous, the quantity of gas expelled from the retort before its neck could be immersed in water, and placed under the receiver, must have been considerable. The whole of the gas, however, was not extracted by means of the water, for the remaining liquor dissolved 5 grains of copper, while 800 measures of nitrous gas were thrown into the retort.

The following facts principally are established by the preceding experiments:—

1. That a mixture of the vitriolic and nitrous acids in a concentrated state, has a peculiar faculty of dissolving silver copiously.

2. That it acts upon, and principally calcines, tin, mercury, and nickel, the latter of which, however, it dissolves in small quantity, and that it has little or no action on other metals.

3. That the quantity of gas produced while the metal is dissolving, is greater, relatively to the quantity of metal dissolved, when the proportion of nitric to the vitriolic acid is small, than when it is large; and that, when the metals are dissolved by mixtures containing much nitre, and with a small production of gas, the solution itself, or the metallic salt formed in it, yields abundance of gas when mixed with water.

4. That dilution with water renders the concentrated mixture less capable of dissolving silver, but more capable of acting on other metals.

5. That this mixture of highly-concentrated vitriolic and nitrous acids acquires a purple or violet colour when phlogisticated, either by addition of inflammable substances—as sulphur, or by its action on metals, or by very strong impregnation of oil of vitriol with nitrous gas.

6. That this phlogistication was found to communicate to the mixture the power of dissolving, though in small quantities, copper, iron, zinc, and regulus of cobalt.

7. That water expels from a highly-phlogisticated mixture of concentrated vitriolic and nitrous acids, or of oil of vitriol impregnated with nitrous gas, a great part of its contained gas; and that, therefore, this gas is not capable of being retained in such quantity by dilute as by concentrated acids. Water unites with the mixture of oil of vitriol and nitre without any considerable effervescence.

To these observations I shall subjoin one other fact, viz., that when, to the mixture of oil of vitriol with nitre, a saturated solution of common salt in water is added, a powerful *aqua regis* is produced, capable of dissolving gold and platina; and this *aqua regis*, though composed of liquors perfectly colourless and free from all metallic matter, acquires at once a bright and deep yellow colour. The addition of dry common salt to the concentrated mixtures of vitriolic and nitrous acids produces an effervescence, but not the yellow colour; for the production of which, therefore, a certain proportion of water seems to be necessary.

Part II.—*On the Precipitation of Silver from Nitrous Acid by Iron.*

Section I.

Bergman relates that, upon adding iron to a solution of silver in the nitrous acid no precipitation ensued,* although the affinity of iron to acids in general is known to be much stronger than that of silver, and although, even with regard to the nitrous acid, other experiments evince the superior affinity of iron; for, as iron precipitates copper from this acid, and as copper precipitates silver, we must infer the greater affinity of iron than of silver. In the course of his experiments, however, some instances of precipitation occurred, which he attributed to the peculiar quality of the irons which he then employed. I was desirous of discovering the circumstances, and of investigating the cause, if I should be able, of this irregularity and exception to the generally received laws of affinity.

I dissolved a piece of fine silver in pure and pale nitrous acid, and while the dissolution was going on, and before the saturation was completed, I poured a portion of the solution upon pieces of clean and newly-scraped iron wire into a wine-glass, and observed a sudden and copious precipitation of silver. The precipitate was at first black, then it assumed the appearance of silver, and was five or six times larger in diameter than the piece of iron wire which it enveloped. The action of the acid on the iron continued some little time, and then it ceased; the silver re-dissolved, the liquor became clear, and the iron remained bright and undisturbed in the solution at the bottom of the wine-glass, where it continued during several weeks without suffering any change or effecting any precipitation of the silver.

When the solution of silver was completely saturated it was no longer affected by iron, according to Bergman's observations.

Having found that the solution acted on the iron, and was thereby precipitated before it had been saturated, and not afterwards, I was desirous of knowing whether the saturation was the circumstance which prevented the action and precipitation. For this purpose I added to a portion of the saturated solution some of the same nitrous acid, of which a part had been employed to dissolve the silver; and into this mixture, abounding with a superfluous acid, I threw a piece of iron, but no precipitation occurred. It was thence evident that the saturation of the acid was not the only circumstance which prevented the precipitation.

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* Dissert de Phlog. quantitate in Metallis.]

To another portion of the saturated solution of silver I added some red smoking nitrous acid; and I found, upon trial, that iron precipitated the silver from this mixture, and that the same appearances were exhibited as had been observed with the solution previous to its saturation.

The same effects were produced when vitriolic acid was added to the saturated solution of silver, and iron afterwards applied.

To some of the same nitrous acid, of which a part had been employed to dissolve the silver, I added a piece of iron; and while the iron was dissolving, I poured into the liquor some of the saturated solution of silver; upon which a precipitation of silver took place instantly, although, when the same acid had been previously mixed with the solution of silver, and the iron was then added to the mixture, no precipitation had ensued.

The quantity of vitriolic acid, or of the red fuming nitrous acid, necessary to communicate to the saturated solution of silver the property of being acted on by iron, varies according to the concentration, and to the degree of phlogistication of the acids added; so that a less quantity than is sufficient does not produce any apparent effect. Nevertheless, when the solution of silver is, by addition of these acids, brought nearly to a precipitable state, the addition of spirit of wine will, in a little time, render it capable of acting on iron.

It appears, then, that a solution of silver is not precipitated by iron in cold, unless it have a superabundance of phlogisticated acid.*

Heat affects the action of a solution of silver on iron; for if iron be digested with heat in a perfectly saturated solution of silver—such as a solution of crystals of nitre of silver in water—the silver will be deposited in its bright metallic state on different parts of the iron; and the iron, which has been acted on by the solution, appears in the form of a yellow ochre.

Bergman relates, that he has sometimes observed beautiful crystallisations or vegetations of metallic silver formed on pieces of iron immersed long in a solution of silver.

I have found that no time is able to effect this deposition unless the solution be in a state *nearly* sufficiently phlogisticated to admit of a precipitation by iron, but not completely phlogisticated enough to effect that purpose immediately.

Dilution with a great deal of water seemed to dispose the solutions of silver to be precipitated by iron more easily. A solution of silver, which did not act on iron, upon being very much diluted, and having a piece of iron immersed in it during several hours, gave a precipitate of silver in the form of a black powder.

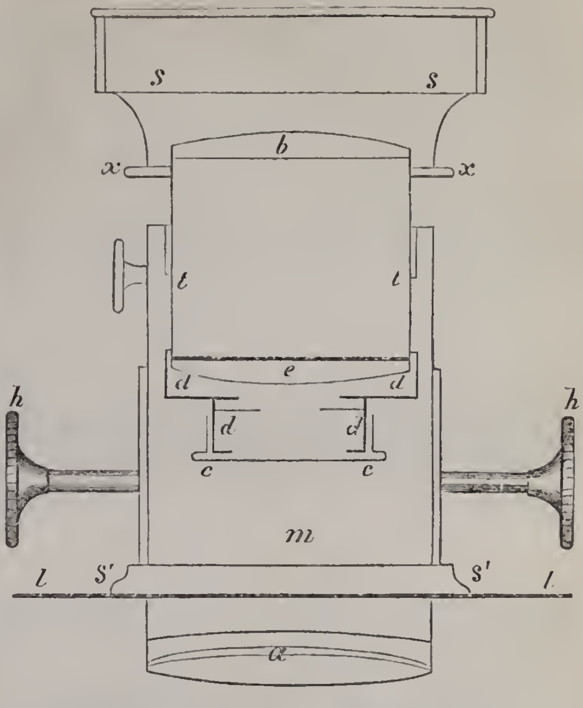
(*To be continued.*)

New Photographic Apparatus.

MELHUISH'S NEW OBJECTIVE.

No special claim to originality is assumed for these lenses. They have been constructed by a photographer of long practical experience, with the view of obviating the inconveniences presented by other lenses, and supplying their deficiencies. They aim at universal applicability; and it is believed that this desirable result is obtained by the peculiar construction and arrangement adopted. In the various combinations, each affords a picture equally well defined, from the centre to the margin, without any other advantages whatever being sacrificed. These results are obtained without any increase of complexity: there are no extra portions to add to the necessary incumbrances of the photographer's baggage, or to perplex and baffle him by their loss. The greatest possible simplicity, combined with universal applicability to the various requirements of the photographer, both in portraiture and landscape, were sought by the inventor in these combinations, and it is hoped they have been successfully attained.

Description.—The front lens, *b*, is of the ordinary size, but the back lens, *a*, is one size larger, thus enabling the operator to throw an equal body of light over the entire surface of the plate, and to take in a larger angle.



The diaphragm may be changed without the trouble of unscrewing any portion of the arrangement, by merely withdrawing the tube, *t;* thus the disadvantage attendant upon the cut in the middle of the brass mounting, as in Waterhouse's stop, is avoided.

The lens has a double pinion to the rack, *h h*, so that either hand may be employed in focussing.

The whole may be packed as compactly and in as small a compass as other compound objectives, as shown in the above diagram.

Combination 1.—The same as shown in the figure, only with the diaphragm portion of cap, *d c*, removed. It forms a portrait lens of short focus, and with the diaphragm *d*, *in situ*, is suited for enlarging and copying.

Combination 2.—As a portrait lens, adapted for pictures up to 6½ × 4¾. It is produced by removing *c d*, and extra lens *e*.

Combination 3.—Is a portrait lens, of long focus, obtained by unscrewing the shade from *x x*, and unscrewing the whole of the brass mounting from the flange *l l*, then turning it round, and screwing *x x* into the flange *l l*. The lens *a* is removed, and the shade screwed on at *s' s'*. Will take a portrait 8½ × 6½.

Combination 4.—Is a landscape lens, obtained by unscrewing the shade from *x*, and the brass mounting from the flange *l*. Then withdraw the tube *t t* from the mounting *m*, and remove the extra lens *e*, but retaining the diaphragm *d*, and the small cap *c*. Screw *x x* into the flange *l l*. Yields a picture up to 10 × 8.

Photographic Notes and Queries.

TONING POSITIVE PROOFS.

Sir,—While thanking your correspondent Charles Martel for his valuable hints on obtaining black tones in positive prints toned with gold, I beg to trouble him for the details of printing positives on albumenised paper with the *tartrate of silver;* whether it is the best mode of manipulating to dissolve the proper quantity of tartaric acid, or tartrate of potash or soda in a small quantity of water; add to the albumen; beat up and float. What strength should be the silver bath?—I am, &c., Glasguensis.

Glasgow, July 9, 1860.

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* It was said in the fourth paragraph that the addition of dephlogisticated nitrous acid to a saturated solution of silver did not render this solution precipitable by iron. Nevertheless, as this acid dissolves iron, such a quantity may be added as to overcome the counteracting quality of the solution of silver, so that the acid shall be able to act on the iron; and while this metal is dissolving, it phlogisticates the mixture, which then becomes capable of being precipitated, and is, in fact, reduced to the same circumstances as are described in the seventh paragraph. The limits of the quantities which produce changes cannot be ascertained, because they depend on the degrees of concentration and phlogistication of the substances employed, and, therefore, whenever a change is said to be produced by a certain substance, it means that it may be produced by *some* proportion, but does not imply by *every* proportion, of that substance. Without attending to these considerations persons trying to repeat the experiments mentioned in this paper will be liable to be deceived.

PHOTOGRAPHIC FAILURES.

Sir,—Permit me to trouble you regarding my photographic failures.

1. Till lately, I have obtained clean pictures; but now every one is stained, more or less, especially the bottom part and corners of the slide, the stained part appearing, by transmitted light, like smoked glass. Sometimes they appear in the shape of a drop of water allowed to fall on a piece of glass, but, with that exception, they have never appeared anywhere but at the sides.

2. On applying the developer, the whole surface of the plate is covered with a brilliant film of metallic silver, which floats on the top: this appears as soon as the image commences to show.

3. I prepared a plate in the usual way, and, after taking it out of the silver bath, covered it with a mixture of glycerine and distilled water; exposed half-an-hour afterwards for four times—the general length of time; then developed. It showed before fixing in all its details clearly, and had exactly the same appearance as an ordinary wet collodion picture after development; but, to my astonishment, on immersion in the cyanide bath, every trace of a picture disappeared, leaving the plate blank.

4. When photographing at a friend's, the dark room being lit by gas, I was unable to obtain a picture; the first was fogged, and each succeeding one became worse. I afterwards saw, by Mr. Hardwich's book, that the combustion of coal gas produced fogging. Do you think that it was caused by that, or the blue light of gas where it issues from the pipe, as I used no yellow screen round it? I omitted to mention that my baths are Hardwich's positive nitrate, sulphate of iron, and cyanide baths.

Hoping soon to receive an answer through your useful paper, I remain, yours, &c.,
W. H. H.

38, *Mincing Lane, July* 10, 1860.

GOLD-TONING BATH.

Sir,—The following is the result of some experiments recently made with an alkaline gold-toning bath, which, if of sufficient interest, you are at liberty to publish:—

TONING BATH.

Water	20	ounces.
Hyposulphite of soda	5	,,
Carbonate of soda	20	grains.
Chloride of gold	10	,,

First dozen toned in this bath in 15 minutes; second, 20 minutes; third, 25 minutes; fourth, 30 minutes. I then added 5 grains of chloride of gold to revive it, when the first dozen toned in 20 minutes; second, 30 minutes; third, 45 minutes; fourth, 70 minutes; the proofs declining in vigour in proportion to the length of time taken in toning. It would appear from these experiments, that the above bath is capable of toning about 50 stereograms, without the further addition of chloride of gold; and if it is desired to tone any more in the same bath (a plan not to be recommended), gold must be added in proportion to the number of prints. Thus, if two dozen are to be toned, add 5 grains of chloride of gold; if four dozen, 10 grains, and so on.—Yours, very respectfully,
Thomas Clark.

ALBUMENISED PAPER.

Sir,—There seems to be an epidemic prevailing this year in albumenised paper, something akin to that with which potatoes and grapes have been afflicted in years bygone. Some samples that I have tried come out full of blisters, which, when once they have formed themselves, do not disappear, but split up in drying, utterly destroying the proof. Other samples appear after passing through the toning bath, as if they had been spattered with a brush dipped in hyposulphite of silver, leaving the albumenised surface of a most ominous hue. Upon inquiry among my brother photographers, I find they are distracted with similar annoyances. These obnoxious results must be due to some improved method of albumenising paper, in which albumen is probably dispensed with nearly or altogether. Such defects never occurred in paper albumenised by myself, and I have prepared a good many reams. In justice to the general body of photographers, the names of those dealers who sell a genuine article ought to be made known, so that we may know which to use and which to avoid.—I remain, &c.,
E. D.

THE ACTINOMETER.

Sir,—I see, by a correspondent's letter in your last number, that the term *Actinometer* is appropriated by the meteorologists to an instrument for measuring the direct *heating* effects of the sun's rays. Judging from the etymology of the word, I cannot but think that the disciples of that department of science have misapplied and misappropriated the word. Am I wrong in supposing that there are other words which more correctly express *heat measurers*, such as thermometer, pyrometer, and calorimeter; while actinometer, I have always been led to suppose, was significant and expressive of *actinism*, or the chemical agency of the sun's rays? We cannot so readily find an expressive substitute for Actinometer as the meteorologists can, and I think, with all due deference, they might have left that word to its legitimate claimants, or found them a substitute for it.—I remain, sir, yours, &c.,
Loco Foco.

TO CORRESPONDENTS.

*** *We are desirous of making this column as useful as possible to our correspondents, and it is therefore a matter of regret to us to be compelled, as we frequently are, to leave letters unanswered for a week, in consequence of their reaching us only on the day of publication. Letters which may be sent to us, either for insertion or reply in the current number, should reach this office on or before Thursday morning.*

Mr. Francis's communication will receive attention.

Obtuse.—One of the best means of intensifying a negative is, after it is fixed and washed, to pour over the plate a solution of iodine in water, then wash it, and expose to daylight; then take it into the dark room, and pour over it a solution of nitrate of silver (7 per cent.) 1 part, solution of pyrogallic and citric acids (2 grains to the ounce of water) 9 parts; any amount of intensity can be obtained, according to the time the solution is allowed to remain on the proof. Wash, then pour over it the fixing solution; wash again, and dry.

W. S.—1. The weakness of your negatives doubtless arises from your treatment of the bath. Acidity should be corrected only with oxide of silver. 2. If the spring water is not *hard*, it will do as well as distilled water; a piece of clean new sponge will answer for a filter. 3. The litmus-paper contains too much colouring matter; soak it for a few minutes in distilled water to remove the excess. 4. The letter referred to has never been received.

L. A. D.—Neutral tint is the best colour for a background. It may be made by mixing whiting and lamp-black with size; a lead colour when dry is a very good tone of grey for the purpose, or common brown paper strained carefully on the canvas of the frame, answers very well. If applied on both sides, backgrounds of different intensities may be prepared. The most suitable colour will very much depend on the object placed in front of it.

H. W. J.—A linseed process was proposed some years ago by Humbert de Molard. His formula is:—Distilled water 1 pint, acetic acid 3 ounces, linseed meal 2 ounces. Macerate twelve hours in a glass vessel, and filter through fine linen or sponge. This mucilage should be colourless. It will keep in a cool place about a week.

J. P.—It is impossible to account for your failures in gold-toning. Your proofs look as if little or no gold was present in the toning-bath; perhaps nearly all the gold has been precipitated by the other ingredients you have added to it. Such failures as you encounter have never occurred in our own experience.

Profile.—Success depends more on the proper distribution of light on your model than on lens or chemicals, although the latter must necessarily be suitable for the purpose to which they are applied. Consult the articles on "Colour in Relation to Photography."

Typo.—The mottled appearance on your positive shows that it was floated on a sensitising solution that had become almost exhausted of its silver: the free acid attacked the albumen. Your other positives, taken on the paper first sensitised on the bath, are unexceptionable.

J. N. S.—1. You will find a description of the focimeter by consulting a file of the Photographic Society's Journal. 2. You can add nothing to the collodion except fresh collodion, made with alcohol and ether, as nearly *absolute* as possible.

W. H. Warner.—We do not publish your formula, because it prescribes the addition of acetate of soda, which is of no use whatever in the bath, but, on the contrary, prejudicial. The bath should contain nothing but solution of pure nitrate of silver, saturated with iodide of silver.

Presto.—You will find your query on instantaneous photography answered in the present number. See article under that head, by Warren De la Rue, Esq.

A Lady Photographer.—There is no necessity for fermenting the sugar you add to your gum. Lump sugar, previously dissolved, answers just as well. We prefer starch, however, for mounting photographs.

Mary Jane.—The fault is in the toning bath, which has got spoiled in some manner. It should not be used before it has been mixed four-and-twenty hours.

Phosphor.—The spots appear to be hyposulphite of silver, arising from splashes on the paper probably, but it is difficult to say without knowing to what accidents the paper has been submitted.

M. W.—The stains appear to arise from the toning solution acting unequally on the print; this accident may sometimes be prevented by dipping the proof in distilled water, and immersing it wet in the toning bath.

Field Worker.—Iodide of potassium would be preferable, on the principle of adding no substance that is not necessary to the operation.

Chloride.—Registration at Stationers' Hall is necessary before an action can be brought. The cost is 5s.

W. H.—The formula for the protonitrate of iron developer was given in No. 92.

S. D. S.—We have many complaints of that particular paper; try Marion's. If the proofs are too red, return them to the toning bath after fixing.

Star.—Penetrating varnish may be made by diluting artist's mastic varnish with half its bulk of spirits of turpentine.

Nemo.—Positive paper, for enlarged pictures, is prepared in exactly the same manner as for small ones.

X. X.—We have not made any recent experiments with bromide and iodide of silver, but see no reason to dispute the authority you quote.

An Amateur, E. W. T.—The fault is in the collodion; add a little ether to it. Cleaning the plates may have something to do with the defect.

Alto.—The article will be continued, as soon as received from the author.

Ariel.—A *quick* lens signifies one having a short focus.

W. J. W——s.—See "Instantaneous Photography" in present number.

*** All editorial communications should be addressed to Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard, London, E.C.

THE PHOTOGRAPHIC NEWS.

Vol. IV., No. 98.—*July* 20, 1860.

COLOUR IN ITS RELATION TO PHOTOGRAPHY.*

BY CHARLES MARTEL.

The varied colours in which the works of nature and art are clothed, form one of the finest spectacles man is permitted to enjoy: hence the strong and universal desire that exists among photographers of producing coloured images of objects that we admire, or that excite our interest. This desire is not limited, however, to the photographer, but is universal, and has given rise to the art of painting. Again, the desire to imitate the works of the painter has led to the arts of the mosaic worker and the tapestry weaver; while economy has stimulated the production of imitations by colour-printing.

At various periods in its brief existence, photography has been promised this essential element to its perfection. Hill, an American, positively asserted that he had discovered the means of photographing in natural colours; but as he never divulged his method, he never succeeded in dissipating the doubts that prevailed as to the good faith of his statement. Many experimenters with the daguerreotype have, at times, encountered accidental effects of colour: thus, the skies have appeared blue, but this might be attributed to solarisation; the tiles of a house have appeared red in the picture, but this colouring was traced to the oxide of iron used in polishing the plate; other experimenters have seen the green foliage of trees, &c., reproduced in their pictures; but it appears that the phenomenon was accidental in its appearance, and could not be repeated at will, nor could the cause of it be ascertained, or referred to any known chemical reaction.

M. Edmond Becquerel has pursued the subject of reproducing photographs in natural colours with very great ardour and patience. His first experiments, published early in 1848, were performed upon silvered plates. Upon these he produced a film of chloride of silver by the agency of chloride of copper. The surface of the metallic silver became covered with a violet film of chloride of silver. This surface, when submitted to the action of the rays of the prismatic spectrum, was impressed with its principal colours. In these experiments, it appeared that the thinner the film, the quicker the action of the colours, but their beauty was greater when the film of chloride was thick. The attainment of the desired degree of thickness is under complete control, by measuring the quantity of hydrogen liberated by the electric current, of which the silver plate forms an element. It appears, also, that the colours may be obtained in a state of greater brilliancy, if the silver plate, inclosed in a metallic case, be exposed during two or three days to a temperature of 86° to 96° F.

So long as the colours thus obtained are sheltered from the action of light, they may be preserved intact for several years; but they rapidly disappear even in diffused day-light, and as no means of fixing them has yet been discovered, it must be evident that the results obtained by this experimentalist possess, at present, no practical value.

M. Niepce de St. Victor, whose name is so well known in connection with photographic research, has also zealously attempted to solve this problem of photographing in natural colours. Avoiding the use of electrical apparatus to form the chloride of silver on the surface of the plate, he employed baths of soluble chloride, which require to be varied according to the subjects it may be desired to represent. M. Niepce announced a very interesting discovery, viz.:—that the chlorides form upon a silvered plate the peculiar colours which they impart to flames. Thus chloride of strontian, which tinges flame red, produces on the silver plate a red colour, which is proportionally more intense than the other colours. A strong blue colour on the plate is produced by the chloride formed by the double chloride of copper and ammonia. From these results, M. Niepce thinks that varied colouring effects may be obtained by mixing the chlorides, varying the composition of his baths, and causing any particular chloride to predominate in them, according to the colour he desires to reproduce.

What we gather from M. Niepce's experiments leads to the conclusion that chlorine, chloride of copper, and perchloride of iron are the most appropriate agents in producing photographs in the colours of nature. These are the agents to which M. Niepce gives the preference, who remarks also, that by varying the proportion of chlorine or chloride, we can obtain any given colour in excess of the others. The results may be obtained by contact, that is, by putting a coloured surface in contact with a chlorinated silver plate: this is the most rapid method. In the camera a very long exposure is required. He observed that metallic colours, like those of gold or silver lace, are reproduced in all their original brilliancy. Such are the published accounts of this experimentalist's researches, but at present we have had no means of examining or testing their results.

Another inquirer, M. Testud de Beauregard, has produced coloured pictures, but by an entirely different process, as he does not operate upon metallic silvered plates. His pictures are obtained on glass and upon paper. But as he has not divulged the process by which he obtained them, we are at a loss to know whether the colours are produced by the agency of light alone, by a single chemical reaction, or by a successive series of chemical reactions. His agent appears to be chromic acid. Whether he succeeds in producing merely a monochromous picture, or one variously coloured, we are not informed; but from the published accounts we gather that the pictures are monochromous.

M. Niepce de St. Victor has succeeded in producing variously-coloured monochromous pictures by the agency of nitrate of uranium; the colours are blue, violet, red, green, brown, &c., according to the reagent applied. Similar results have been obtained by Mr. C. J. Burnett, Mr. Hannaford, and other experimenters.

This reproduction of natural colours is certainly the most important and interesting problem in photography that remains unsolved. We have pursued the subject at intervals for nearly twenty years, and confess, reluctantly, that no expectation or hope that the problem will be solved can be reasonably indulged in. To say that its solution were impossible would be rash and presumptuous; but we base our conclusions on the very exacting and opposing nature of the conditions to be fulfilled. First, there is required a substance capable of assuming simply, or by chemical reaction, all the varied colours of nature, with their multitudinous hues and tones; next, it is necessary that this substance should be acted upon in an equal degree, both by natural colours and by artificial colours or coloured bodies resembling the natural colours in hue and tone; and also that the pictures produced with this substance should not be falsified by the unequal actinic power of variously-coloured rays. This, in our present state of knowledge of the properties of coloured and colorific bodies, is more than we have any reason to expect; it is demanding too much. We might succeed in obtaining a sensitive medium, which would be acted upon by the yellow rays or the red rays, and yet the pictorial result be marred by the unequal action of the blue rays, and *vice versâ*. Or we might find a sensitive medium that would undergo an equalised action under the influence of the colours of natural bodies, but not be so tractable under the influence of the colours of artificial substances. At present we know of no such sensitive medium, nor is there any great probability of such a one being soon found. We have succeeded in obtaining all the prismatic colours on films of iodide and chloride of silver, which is so far encouraging, inasmuch as it shows that bodies exist capable, under certain conditions, of assuming all those various colours; but this result seems to be due more to electrical than to chemical action, for the colours appeared spontaneously under the influence of diffused daylight, and were not the photographic reproductions of coloured objects. Again, it is to be considered that these films of iodide and chloride of silver might be capable of assuming the prismatic colours, but not the multitude of broken colours, or greys, which most natural and artificial bodies reflect. Pure prismatic colours very seldom occur in the objects the photographer is most commonly called upon to depict. In flowers, birds, and insects alone, are these pure colours met with; and when a colour is what painters term *broken*, it becomes very difficult to ascertain of what primary or pure colours it is composed. Two coloured bodies, exactly similar in hue, will sometimes possess very different actinic power, and consequently the photographic image must vary in like manner. The most luminous and brilliant colours, such as red and orange, are those which have the least chemical action on the sensitive films at present in use; and this fact demands the most serious consideration of those who are in search of photography in natural colours. It may happen that all sensitive media are acted upon by light in the same way as those already known, and it is more than probable that such will prove to be the case. If so, then photography in colours is an insoluble problem. The difficulty may, in practice, be partially overcome by artificial appliances, such as illuminating objects by a light rich in actinic power; but even this expedient could not be adopted in landscape-views, or other out-of-door scenes. Notwithstanding the apparent hopelessness of the case, however, it behoves all experimentalists to watch narrowly for every appearance of the reproduction of the natural colours of objects, and to note the exact conditions under which they are produced, especially whether these conditions be normal or abnormal; for it may happen that partial or complete success is lurking beneath the most trifling deviation from our present formulæ or manipulation. The chromatic Proteus may come in the shape of a new developing agent, or of a hitherto unheard-of salt of silver, or a novel toning solution. The field of resources is wide and rich; fruitful in material and expedients; and although a successful result would surprise, it would none the less gratify a long-cherished, but hopeless desire.

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* Continued from vol. iv. p. 122.

Meanwhile let the photographer study the principles of chiar-oscuro, and avail himself of the wonderful resources it places in his hands. The greater the perfection arrived at in photographic chiar-oscuro, the less we shall miss and regret the absence of colour. The difficulties being greater, the thoughtful and accomplished artist has a better opportunity of evincing his skill and taste, by producing a satisfactory picture in chiar-oscuro, than if all the resources of Nature's palette were at his command.

The consideration of colouring photographs by artificial means does not come within the scope of these essays, but belongs strictly to the art of painting.

(*To be continued.*)

INSTANTANEOUS PHOTOGRAPHY.*

BY WARREN DE LA RUE, ESQ., F.R.S., ETC.

The Collodion.—The condition of the collodion is also an all-important point, and it appears to be very capricious in its properties. It is preferable not to make the collodion oneself, but to use that prepared by makers of repute.

It is desirable to sensitise frequently new batches of collodion, and to determine by experiment, from time to time, the gradual development and decline in their sensitiveness.

Collodion should not be sensitised until it has stood for at least a week after it has been purchased; and it must then be carefully poured into the mixing vessel, without disturbing the sediment which always is present. It must be agitated occasionally for some hours, after mixing with the sensitiser, before it is set aside to rest and deposit the new sediment which forms. After standing for a week, it should be carefully decanted for use, to the extent of three-fourths, into a perfectly clean glass vessel.

The glass-mixing vessels should invariably, previous to use a second time, be washed out, first with a mixture of equal parts of ether and alcohol, and then with water and pieces of blotting-paper, well shaken up, so as to reduce the paper to pulp; and, finally, rinsed out with distilled water, and suspended in a warm place, mouth downwards, to drain and dry thoroughly.

Iodide of cadmium appears, on the whole, to be the best sensitiser for collodion to be used in celestial photography. Collodion prepared with this salt is not very active when first mixed; hence, it differs from collodion prepared with iodide of potassium and iodide of ammonium, in this respect, but it gradually acquires a degree of sensitiveness unsurpassed, if equalled, by collodion rendered active with the latter salts, used either alone or mixed with other salts. Collodion mixed with iodide of potassium acquires, it is true, great sensitiveness soon after it is prepared, but in a few days it loses in this respect, is, moreover, continually changing, and is seldom available in celestial photography after standing a month or six weeks; whereas, cadmium-collodion will retain its qualities for several months. As fresh-mixed collodion is certain to produce both white and dark specks in the photograph as large, or larger, than the details visible in the picture with a magnifier, it will be seen that a collodion which can be kept a long time to deposit, without losing in sensitiveness, must be the most valuable; moreover, in collodion mixed with the alkaline iodides, there is always an evolution of free iodine, which soon impairs the sensitiveness of the nitrate of silver bath, by rendering it acid; and for these reasons I generally give the preference to cadmium-collodion.

Sometimes collodion exhibits a reticulated structure after the photograph has dried, which materially militates against the beauty of the picture, and prevents its being highly magnified; it occasionally happens that this defect cannot be cured, in which case the collodion should be rejected. I have generally found, however, that this "craping" may be obviated if the collodion be diluted, more or less, with a mixture of two parts of ether and one part of alcohol when it is being sensitised, care being taken to add as much of the solution of iodide, in relation to the diluting liquids, as would have to be added to an equal volume of collodion.

After using collodion for several evenings, it is well to allow it to stand for some days, and to decant about three-fourths into a glass vessel. Before pouring the collodion on to the glass plate, the usual precaution of cleaning away with the fingers any dried collodion from the lip of the bottle must be attended to; moreover, each time, just in the act of pouring, a few drops should be allowed to fall to waste on to the floor. By attention to these remarks, much vexation will be avoided.

Exposure of the Plate.—On taking the plate from the nitrate of silver bath, it is desirable to drain it well before it is put into the slide: first, on the edge of the bath, then on white blotting-paper, shifting its position two or three times, but always keeping the same point downwards. It must be carried to the telescope as quickly as possible, and the picture developed immediately after it has been removed from it.

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* Continued from vol. iv. p. 123.

The sensitised plate rests on angles of pure silver let into the square plate-holder, or in the circular plate-holder, within a ring of pure silver, the face resting on three prominent places. I have found that contact with wood is liable to produce stains, which occasionally extend across the plate during the development. The circular plate-holder is entirely of metal, and I would recommend metal plate-holders, in preference to those of wood, for celestial photography, because they are not liable to warp and become set from damp when left in the observatory. The plate-holder should be wiped with a clean cloth after each operation, and the hands also washed each time before a fresh plate is taken, on which it is intended to pour collodion.

In order to subject the sensitised plate to the action of light when the telescope is used as a Newtonian, I remove a very light cover previously placed over the mouth of the telescope, and replace it when I wish to discontinue the action; this cover is made of black merino, stretched on a whalebone hoop, and is provided with a handle of bamboo. In the direct method, I turn up or down, through an arc of 90°, a little hinged trap, interposed between the great mirror and the sensitive plate. This motion is given by means of a lever fixed on a light axis, supported by the arm which holds the small camera; the axis extending beyond the edge of the telescope, and carrying a milled head, by which it is turned.

Regulation of the Time of Exposure.—A journeyman-clock, beating seconds distinctly, should be near the telescope, in order that the operator may be enabled to regulate the time of exposure, which requires great nicety with such chemicals as must be employed.

The time occupied in taking lunar pictures varies considerably; it depends on the sensitiveness of the chemicals, on the temperature, on the altitude of the moon, and her phase. An almost imperceptible mist in the atmosphere will sometimes double the time of exposure; but, curiously enough, a bright, fleecy cloud passing over the moon scarcely stops any of the actinic rays. I have recently produced an instantaneous picture of the full moon, and usually got strong pictures of the moon in that phase, in from one to five seconds. The moon as a crescent, under like circumstances, would require about twenty to thirty seconds in order to obtain a picture of all the parts visible towards the dark limb.

Development of the Picture.—Of all the developing mixtures tried, I give the preference to the aceto-pyrogallic solution, which is generally used in the ordinary proportions, namely:

Pyrogallic acid	3 grains.
Glacial acetic acid	1 fl. drachm.
Distilled water	3 fl. ounces.

But in cold weather I sometimes reduce the quantity of acetic acid to one-half, to render the solution more active. The developing fluid retains its properties for a week or more after mixing. It is advisable to pour out the requisite quantity of fluid into a small vessel, and to place it in readiness before the plate is removed from the bath and put into the slide, so as to prevent any delay after the plate has been exposed in the telescope. This precaution obviates the staining which arises sometimes by partial drying of the film. The addition of nitrate of silver to aid in bringing out the picture must be avoided; pictures thus intensified will not bear any magnifying power, and are comparatively worthless. Hence, it will be seen how all-important it is to have the bath and collodion in their most sensitive condition. The negative should not be developed too strongly, as such pictures never copy so well as those moderately but distinctly brought out. Such small photographic pictures as those of Jupiter and Saturn present many obstacles to their development, on account of the difficulty of discerning them during the operation; for the focal image of Jupiter in my telescope, even when the planet is in opposition, is only about $\frac{1}{37}$th of an inch in diameter.

After the development of the picture to the desired point, the further development is arrested by pouring a quantity of water on the plate, and a vessel containing water should be at hand for this purpose.

Fixing the Picture.—By preference, I use hyposulphite of soda for fixing. After fixing, the plate is washed under the tap of a cistern of water for a short time, and then examined with a lens. If worth retaining, the epoch of the picture and other particulars are recorded on the back with a writing diamond. The plate is then washed again, front and back, in a stream of water, and placed face upwards on a tripod stand, duly levelled; rain-water* is poured on the collodion, and from time to time this is drained off and fresh poured on; in the meantime, other photographs are proceeded with. After half an hour or more, the plate is thoroughly washed in a stream of rain-water, and placed edgewise on blotting paper against the wall to drain and dry.

Varnishing.—The next morning, the negatives are warmed before a fire, and varnished with Soehnée's varnish,† which is the only description I have found to stand. I am careful to filter the varnish before using, otherwise, specks might be transferred to the photograph. It is very desirable to varnish the plates as soon as they are dry, for, if left unvarnished for any length of time, they can never be varnished evenly.

PHOTOGRAPHY AND ITS APPLICATIONS.

ON THE EMPLOYMENT OF PHOTOGRAPHY IN SURVEYING AND MILITARY RECONNOITERING.‡

BY M. A. LAUSSEDAT.

In order to appreciate the value of the application of photography to surveying and reconnoissance, it is necessary to consider the methods previously employed in those arts: with chain and theodolite the surveyor traversed the ground, or by triangulation measured angles and determined bases, and thus mapped the field of his labours. But, in hasty reconnoissances, it is not always possible to proceed so methodically; the surveyor is obliged to content himself with hastily sketching certain salient points, and afterwards determining their angular distance by the method usually followed in hydrographic surveying—this method is frequently adopted in military reconnoissance.

In 1851, Captain Laussedat made a report on the employment of the camera lucida in topographical surveying, in which he explained, for the first time, the very simple graphic operations required in the construction of the plan of the panoramic view, two portions of which are taken at the extremities of a base, of which the length and position are known. The author pointed out the following modification in the prism by which the image of the panorama is conveyed to the eye:—He placed upon the angle of this prism the optical centre of the spherical concave cap of Wollaston, and he gave a length of radius of about 6in. to this lens. By this twofold arrangement, the rays emanating from distant objects had the same degree of convergence as if they came from points situated at 12in. distance from distinct vision, so that the draughtsman perceived with equal clearness the image of the object and the line of the pencil on the paper; the eye experienced no fatigue from the adaptation, and the parallax is completely annihilated. The optical centre, thus definite in position, becomes the *mathematical point of sight of the perspective*; its projection on the plane is *the principal point*, and its distance on the picture gives *the distance of the point of sight.* We easily arrive at the knowledge of these three elements which suffice for the production of geometrical plans, by the aid of which we proceed from perspective views to orthogonal projections. Numerous experiments have been made on the ground with this instrument, and the results appear quite satisfactory. By means of this method, Captain Laussedat was able to draw, in a couple of days, a sufficient number of views to supply the details of an incomplete plan of a city of 15,000 inhabitants, and to furnish the elements of a levelling sufficiently exact of the accidental features of the city and its environs.

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* In preparing the bath and developing solutions, distilled water must be employed, but filtered rain-water answers very well for washing the photographs.

† Sold by Messrs. Gaudin.

‡ Report presented to the Paris Academy of Science.

Photographs of landscapes are, in fact, only perspectives, and all that has been said respecting views taken by the camera lucida applies also to photographs. In consequence of this complete analogy, the question of priority loses its importance, for, during the last few years, several persons have suggested the application of photographic surveying; even so long ago as 1851, Captain Laussedat, being then engaged with the camera lucida, suggested the application of photography. But the art was not at that time sufficiently matured to make this application available; recent improvements have made of photography a true art, and by the aid of dry collodion, a survey or reconnoissance may be made in an incredibly short space of time.

The superiority of photographs to sketches taken with the camera lucida are readily apparent on comparison being made between them. The photographs are infinitely more complete, for they omit no detail, and they can be executed on a much larger scale; they make the true aspect of the ground known in its minutest inequalities; a few hours' sojourn in a place is sufficient to obtain a reconnoissance; they have also all the advantages of perspective views, the graphic operations, by the aid of which we proceed from the perspective view to the construction of the plan, may be performed without difficulty by persons who have never been on the ground, at any distance from the places where the proofs were taken, without their being exposed to regret and disappointment in not being able to return to supply omissions, for the engineer stationed in his cabinet has, as it were, the ground before his eyes.

M. Laussedat takes his views on dry collodion plates, from which paper positives are subsequently printed. The collodioned plates retain their sensitiveness several weeks, and may be carried from place to place, after being exposed in the camera, without injury. The photographic baggage is reduced to the camera and a box of dry plates; no manipulations on the ground are necessary. A spirit-level adjusted to the top of the camera is employed to facilitate levelling; the apparatus possesses all the advantages of geodesical instruments without requiring the same exactitudes.

(*To be continued.*)

SCIENTIFIC GOSSIP.

Undoubtedly the solar eclipse is the great occurrence of the week; and whilst we are anxiously awaiting news from Spain to know what success has attended the numerous attempts which have doubtless been made to obtain photographs of the magnificent and awful phenomena only to be seen during the totality of obscuration, our readers may not object to a few notes on this all-absorbing subject, in anticipation of the numerous correspondence which will doubtless reach us before our next impression. Not disheartened at the almost total failures of all attempts to obtain photographs of the last solar eclipse in March, 1858, which were frustrated by clouds, those photographers who were in possession of adequate appliances have been for some time past busily preparing their apparatus and "instantaneous" movements, and rehearsing their parts at every glimpse which could be obtained of the sun. On the former occasion there were many different statements made, respecting the advantages of the various processes, dry and wet, for the purposes of solar photography, and at one time it was almost thought that the collodio-albumen process was going to be *the* process for all such work. Latterly, however, we have been carefully engaged in experimenting on this subject, and have come to the conclusion that, on the whole, the ordinary wet collodion process is preferable; the only precaution required being to add one grain of bromide of cadmium to each ounce of iodised collodion, and to have just a trace of acetate of silver in the bath. The best photographs of the last eclipse which we saw in 1858, were taken by Mr. Spiller, of the War Department, who used for the purpose the beautiful little equatorial telescope belonging to the Royal Military Repository, Woolwich. Amongst solar photographs, nearly the best we have seen were taken on that occasion by Mr. Crookes, whose apparatus would have doubtless taken the best views of the phenomenon, had not the sun been obscured by clouds. On the present occasion, the two gentlemen above-named agreed to unite their forces, and accordingly, on Wednesday last, were occupied all the morning in the grounds of the Royal Military Repository, in the endeavour to fix as much of the obscuration as was to be seen in England. The chief process which these gentlemen relied upon was the wet collodion, as above-mentioned; but plates of all kinds were in readiness. We have not yet heard what amount of success attended their efforts, but shall be sure to have some account of their labours in time to lay before our readers next week.

Respecting the so-called red flames and prominences visible in a total eclipse, some ingenious speculations of the Astronomer-Royal at Munich, Dr. Lamont, have recently been published. It will be remembered that numerous attempts at explanations have been given from time to time, but most of them have been attended with great improbability. Some have considered them to belong to the moon, but this hypothesis is at once negatived by the fact that they are never visible, except on the occasion of a total solar eclipse, and, were our satellite attended with such enormous appendages, they must be visible at some other times, if not always. Others have considered that they belong to the sun, and of the two theories this is by far the most probable; moreover, they have been found to *move with the sun*, not with the moon, which at once negatives their lunar origin. Dr. Lamont now brings forward some very cogent reasons for considering them to belong to the earth. He argues that the reduction of temperature necessarily accompanying a total withdrawal of solar heat from the atmosphere, will cause clouds to precipitate in the limits and on the margin of totality. The intense light shining round the edge of the moon will illuminate the outer parts of these masses of aqueous vapour, and will cause them to appear rose-coloured, pink, white, or black, according to thickness, whilst the parts in front of the moon will be invisible. In this way all the phenomena of the red prominences can be explained. In fact, observers have on former occasions noticed occurrences which can hardly be accounted for on any other hypothesis; they have been observed of all colours, and several times had so decidedly a cloud-like character, that it is a matter of some surprise that this explanation did not strike the observer at the time. The present expedition of English and French *savans* to Spain has decided upon making some definite observations on these prominences, with a view to ascertain which of the three hypotheses is correct, that of their solar, lunar, or telluric origin.

We learn, from a communication by Mr. G. J. Symons, that a series of photometric measurements have been made by means of prepared photographic paper, sections of which were exposed to the sun's rays for five minutely intervals, from 1·25 to 4·15 p.m.; "the result," says Mr. Symons, "is a graduated scale of tints, of the beauty and utility of which I am not, of course, an impartial judge, but I shall intrust the record to Negretti, for the purpose of having it copied (by photography) on a small scale for private distribution among those who are interested in such matters; they, therefore, can form their own opinions."

Some very excellent remarks by Mr. Seely, on the subject of dry collodion, have recently come to our knowledge. He regards the subject in a strictly scientific manner, and gives, as we are inclined to think, as rational a view of the theory of the subject as has yet been broached. Most of the attempts at solution of the dry collodion problem have been altogether empirical. Experiments have been made at random, in the vain hope that something might by chance turn up. This is working in the wrong direction; a theory should always be followed—a bad one is better than none at all. Mr. Seely's theory is as follows:—Salts of silver are decomposed under the action of light only in presence of organic matter; but the rapidity and amount of this decomposition greatly depends upon the kind of organic matter which is present. Gun cotton, for instance, is powerless to act in this respect; when moistened with solution of nitrate of silver it is unchanged in the light, and hence a surface of gun cotton, imbued with silver salts, is not all that is required for the photographic result; some other easily acted upon organic body is requisite, and in the ordinary wet collodion process we find an abundance of such organic matter. To this is due the rapidity of the process. How, then, are the circumstances changed, when the sensitive plate is washed and dried? The water used in washing carries away whatever is soluble, and, on drying, whatever is volatile is also removed, so that between these two processes the requisite organic matter is removed. If this theory be true, the problem is much simplified; the most suitable organic matter must be selected, and then we may determine how it shall be introduced into the film, whether by the bath, collodion, or after sensitising. Of course this matter must not be volatile nor soluble in water, at the final washing. The bath does not seem to be the proper vehicle, for the substance would most likely react upon and reduce the nitrate of silver, and also being soluble in the bath it would most likely dissolve in the final washing water; neither does it seem advisable to introduce the organic substance during or after the final washing, owing to the difficulty of securing an uniform penetration. The solution of the body in the collodion seems, therefore, to be the most reasonable alternative; and when the suitable matter is found, soluble in alcohol and ether, and not in water, the dry collodion process may be considered to be reduced to its most simple form.

Since writing the above, we have been favoured with an inspection of upwards of twenty photographs of the eclipse, which were taken by Messrs. Spiller and Crookes, on Wednesday last. They form a complete record of the passage of the moon over the solar disc, and are by far the most successful photographs of the kind which we have yet seen. We have also heard by telegram, from Santander, that Mr. Warren De la Rue has met with perfect success with the photo-heliograph which he had taken from the Kew Observatory. Several photographs were taken of the different phases, and two during the three minutes of total obscuration, showing the red flames and corona. The red flames were seen in the two photographs *not* to follow the motion of the moon, but to remain apparently attached to the sun. This, however, does not prove them to belong to the sun, as, according to Dr. Lamont's theory, mentioned above, they would have presented the same appearance had they belonged to the earth's atmosphere. We hope to be able to give full particulars of both Mr. De la Rue's and Messrs. Spiller and Crookes' experiments next week.

The Photographic Tourist.

A TOUR ON THE BORDERS OF DEVON AND CORNWALL.*

We went a mile up the road to the Chapel Cross, and here, from an old field gate, close to the Holsworthy and Milton direction-post, I got a fine view of the tower of the former place, with a long line of slightly broken effect, while, on the right-hand corner, a group of trees and some old farm buildings made up a most interesting picture. We now went about two miles further towards Holsworthy, where the cross road leads to Bradworthy on the right, and Anvil Corner on the left. Here, from a high mound of earth and stones, a good picture may be got; in fact, a more than usually good one, for though the principal object, viz., the tower of Holsworthy church, is the same as in the last, yet the change of position, nearer by a mile, alters the effect marvellously. It is a picture, the proper designation of which would be "The Four Cross-Ways." The old guide-post in the front, to Bradworthy on the right, to Launceston on the left; a hedge and bank on either side, closing in the road that leads to Holsworthy, sufficiently low to offer no obstruction to the clear definition of all beyond it; a flat middle distance, with the canal and wharf on the right, and to the left the old, ruined mill on the rising ground, with the tower of the church standing bold and clear in the centre of the picture; with the fine slope of hills, and tower of Bridge Rule in the clump of trees, form as good and effective a specimen of border landscape as can be desired. I was quite satisfied with this picture, and returned to "Thornberry Town" by way of Cookbury, taking in the hollow, after passing the first farm-house, a splendid "Blackberry Brake," with run of water, and fine rising wood for a background.

I went the next day to the first cross-way on the road to Holsworthy Beacon, and got a good "bit" of distance similar to the four cross-ways picture, with fine effect of the Dartmoor Hills. Passing on to Holsworthy Beacon, and taking the Bradford road, about a stone's throw from the cross-way to Stratton, and just within the gateway of a field, another very good view may be got. We now turned back home by Thorne, and passing the keeper's cottage on the brow of the hill, arrived once more at Thornberry Town, and where we tried some of the landlady's ham and eggs, fried potatoes, well-baked bread and hot tea, and found everything excellent.

In the morning, up early, and off with the lad to "Abbots Bickington," about three miles distant, where I found a most picturesque old church, with sugar-loaf steeple. We now turned back, and came to several detached cottages, that made good stereo. pictures, one in particular in the hollow of the road to Milton, and another a little further on in the bye-road leading to Berry. In the morning I got my things carried on to Holsworthy by a butcher's cart, with directions to leave them at the Temperance Inn; then taking leave of my civil and obliging host and hostess, and the two handy boys, not forgetting Lewis the rat-catcher, who had dropped in for more beer hot, I walked on to Holsworthy Town, five miles. After a rest and a look round, I went about on the Hatherleigh road, and turning in to a gateway opposite an old cottage, came on an old-fashioned house called Hardwick. The house itself is of no moment; but from a small gate on the left, closed in on either side by two fine trees, is a capital view of the church and town. Another very good view of the town is to be obtained from the road to Ashwater. I went further on to Hollocombe Moor, and came upon the old church, which makes a fine stereo.

In the town there is nothing worthy of notice. An old, ruined market house, that stood in the centre, has been pulled down, leaving a pump standing, and instead of removing this some few yards down to the new market, it has been cased up with a gothic abortion, so that, instead of leaving the market-place quite open and clear, they have removed a nuisance and put up an obstruction. At the end of the town is an inclosed piece of waste ground called the "Mazery," and you are informed that the key can be obtained at the Stanhope Arms, and that the said "mazery" was designed and planned by Lord Mahon, who, with all due respect, we think might have been better employed, and the ground put to a much better use. The tower of the church, with the west window and door from the road, make a good "bit." I now packed up and sent the things on to the Red Post Inn, on the Stratton road, and in the county of Cornwall. As the distance was short, some five miles, I leisurely walked on, and, after passing the Union-house, came to a well by the road-side, surrounded by briars and brambles, with a high tapering ash on the left, a most beautiful stereoscopic "bit." This was all I saw worth notice, so walked on to the Red Post Inn. Leaving the Red Post for a quarter of a mile, I came to Presticott Cross, Launcels, and got a room at a blacksmith's cottage at the corner, and in the direct road for Kilkhampton.

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* Concluded from vol. iv. p. 127.

Stratton, about two miles from this, offers a variety of inns and public houses, and from the large number, ten or twelve, in so small a place, I fear the temperance movement does not flourish there. On looking round about Presticott Cross, and making inquiries, or, as the natives call it, "fishing out sense on't," I heard of one Rich. Lane, who, I was told, "knowned all about the anshun livers as wur dead, and the anshun 'ouses as was pulled down;" so, looking out for Rich. or Richard Lane, who lived at Grimscott, I found him to be a shrewd, knowing cordwainer, more given to gossip and long-winded stories than work—a sort of rural Mogg or Murray. In short, Rich. knew everybody and every place, with the ancient and modern history of the same, for miles round, so I engaged with Richard to avail myself of his assistance occasionally on moderate terms. The first view that took my attention here was from the road near the tile yard, close to the canal, about one hundred yards from the Red Post Inn. Standing by the parapet of the bridge that crosses the canal, your eye follows the same winding in a bold curve to the left, a rough, wooden planking with rails and upright crosses from the right bank in the foreground, while a branch of the canal ending in the distance like a silver thread, sweeps away to the right; in the middle of the picture, a bold sweeping hillock of oak and fir tapers away to the extreme right, while the fields and hedge-rows about Church Town are crowned on the summit by Bridge Rule church itself, a bold, massive tower, standing well out against the sky.

Going back to Presticott Cross, I took the road to Anderton, and found, from the third or fourth gateway in the lane on the right-hand side, a capital "bit," such as the late David Cox, or De Wint, the fine water-colour painters, would have revelled in, one view taking in the subject to the left, with Pyworthy Tower embedded in a fine clump of trees; the tower itself having a "Mystery of Udolpho" appearance about it that is rarely to be met with. The other view, catching the towers of Germans Week and Bridge Rule, is equally fine. Following the lane for about half a mile, you come to a stile, or, as the people call it here, "some bars;" crossing the same, and following the footpath for a quarter of a mile, you come to a stone quarry, a short distance from the canal; from this point you have a fine panoramic view over to Bride, with the bold bluffs of Widmouth and Padstow in the extreme distance. This, with a good light, and lens that will define up the edge, is a most satisfactory subject. I now retraced my steps to my room at the Cross, developed my pictures, and cleaned all up for the next day's work.

In the morning I took the road to Stratton, and, before coming to a few old houses called Presticott, I found, from the last gateway on the left, a capital picture, with the church and village of Week St. Mary in the distance. This view, with the wood-embedded homestead, rich sloping meadows, and fir-tufted high ground, right and left, deserves to be photographed. I now went down to Launcells church, and got a good view of the east windows. If the clergyman and churchwardens would have some of the trees lopped and trimmed up, a capital view of the tower and porch, with the entrance-gate and side-bars, might be obtained; as it is, the view is crowded, hid, and unsatisfactory. With a Goddard lens—or any that would give straight lines to the edge of the field—the interior of the church offers some good subjects, the church being fitted with old, carved, low seats, the ends of which are boldly and admirably worked out. The "Strickett pew" is a fine specimen, and in good preservation; the font at the west end, and old monument in the east corner, are good subjects. There are in this neighbourhood many fine stereoscopic "bits" of old gates, bramble brakes, and foot bridges, with dark, clustering leaves of the thorn, yew, and ash, which may be selected from, and noted in, a photographic ramble. I now took the road to Stratton, and, from a place called Lake, got a good narrow road or lane view; rough parapet of the old bridge; a couple of rough posts and gateway, with an effective ash-tree in the front; while the distance embraced a sweep of wood, with the old tower rising in very elegant proportions from the centre of the trees. Another good view of the tower, with a white cottage, and dwarf palings in front, may be obtained just as you enter the town; while from the ground in front of the New Inn you can get one of those peculiar "bits" rarely to be met with: in front, a ruined, old-fashioned dwelling, with old brick chimneys; a large overhanging window in front, supported by old brackets underneath, with dark arch to the left; while over the same rises, in fine, straight lines, the massive, well-built tower and decorated pinnacles. The whole of the tower, west windows, and doorway may be taken from a point in front of the Ring of Bells. The interior, with the low-carved, open seats, offers a very good subject; while an excellent general view of the town itself may be got from the rising ground on the Bude road, distant about five minutes' walk. Stratton is celebrated as having been the spot in and near which the decisive battle between King Charles and Cromwell was fought, and one or more old mansions have much interest for the artist and antiquarian, as the hiding-places of the unfortunate monarch.

Having business that called me back to the "City of the Red Earth" (Exeter), I packed all up, and having got the things—with the assistance of the Grimscott cordwainer, Dick—to the Red Post, I returned by the omnibus to Copplestone; the cordwainer much disappointed from my not visiting Dunsmouth, where, if he could not show me the house, he could show me where it stood. This same Dunsmouth was once the manor and barton of the Granvilles. According to the cordwainer's version of the story, the successors of the family had no peace, day or night, as Sir Bevil had an awkward knack of coming up (Corsican Brother fashion) on one side of the fire-place, and going down on the other, with the thoughtful and humane arrangement of never disturbing the cat—a very *cat*-ching effect for an East-end playhouse. However, time pressed, and away I went. At Copplestone, I sent the things on by the train, and walked forward to Crediton, and then to Newton St. Cyrus, to have a look at the church and village. The church stands well, and would photograph satisfactorily inside and out; while a good view may be got from the hill, with Newton House to the right.

I now crossed to the station and took the train on to Exeter, after a very pleasant and inexpensive trip, having secured some first-rate pictures, and noted and inquired about many places for a future visit. I attribute much of my good luck with regard to the pictures to always having some one at hand to assist, picking particular kinds of days, and keeping away from towns and crowds, choosing those subjects where you have quietness, clearness, and non-interruption. J. G. F.

ON THE PRESENT STATE OF OUR KNOWLEDGE REGARDING THE PHOTOGRAPHIC IMAGE.*

REPORT OF THE COMMITTEE, CONSISTING OF MESSRS. MASKELYNE, HADOW, HARDWICH, AND LLEWELYN.

The chemical problem presented by the photographic image is one of great complexity. It is uninviting to the chemist, in so far as it presents very little opportunity of his obtaining quantitative results; for howsoever subtle and rapid be the chemical transformation effected by the light, it consists, in most cases, of a superficial change only, and defies even the delicate methods of the balance. In undertaking to collect what is known, and to test the correctness of what has been published regarding this intricate problem, the Committee have proposed to themselves to deal first with the simplest transformations on which photographic processes are founded, and to pass on from these to the more complex.

Moreover, they confine themselves to the photographic results obtained with the salts of silver, as these are the most employed, and because it is necessary to assign some limits to their inquiry.

If the salts of silver are the most remarkable for their susceptibility to photo-chemical change, one is naturally led to search first for the causes of this among those simpler compounds of the metal in which the transformation is not complicated by the secondary decompositions which might be expected to accompany it in the case of organic compounds. Yet, among the inorganic compounds, this susceptibility to photo-chemical decomposition is rare; and though not absolutely confined to one salt, the chloride of silver, that body exhibits the simplest and one of the best illustrations of it.

The chloride of silver, when perfectly pure, passes, on exposure to light, from its pure white through various stages of change in hue, in which blue is mixed with grey, until it finally reaches a deep slate-violet colour. Chlorine is evolved from the chloride; but the question which here meets us, *in limine*, is one which probably underlies the whole of the problem we have to consider, and consists in the chemical condition in which the silver remains after the light has completed the decomposition so far as it can go. Is the result a subchloride of silver? or are the chlorine and the silver completely dissevered, the gaseous elements going away, and the metal remaining mixed with, or rather encrusting, particles of unaltered chloride?

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* From the Report of the British Association for the Advancement of Science for 1859.

Certainly the weight of authority is in favour of the latter view. Such, at least, is to be gathered from papers by Dr. Draper, of New York,[*] by Mr. Guthrie,[†] and more recently from a series of papers by MM. Davanne and Girard, in France.

In the first two memoirs referred to, an allotropic state of the metallic silver is viewed as the only explanation of the reactions of the dark substance formed by the light. No chemist, however, has yet produced this substance in such a state of purity as to be able to subject it to an analysis; and the only arguments, therefore, which can be relied on in explanation of the change are such as make the fewest assumptions and put the least strain on the present experience of the chemist.

There have been many methods proposed for the production of a subchloride of silver by processes directly chemical. One of these consists in the suspension of silver leaf in a dilute solution of sesquichloride of iron, or of chloride of copper. But this experiment has been repeated by us, and we are compelled to look upon the purple-tinted product as chloride of silver accompanied by but a trace of a substance possessing a profoundly colouring power, which, as will presently be explained, we believe to be a subchloride.

In order to produce this substance with, at all events, a greater approach to isolation, we endeavoured to avail ourselves of the possibility of a reaction between chlorhydric acid and the suboxide of silver, and, with this view, instituted many experiments for the production of this last body in a state of chemical purity. Memoirs devoted to the chemistry of the suboxide of silver are not rare. Professor Faraday[‡] showed that the deposit formed by the exposure to the air of an ammoniacal solution of oxide of silver, consists of a compound with a composition of 108 silver and 5·4 oxygen. This composition is incompatible with a formula Ag_2O (supposing oxide of silver to be AgO); but the physical characters of the body are interesting. It is grey, and by reflected light is seen to possess a strong lustre. By transmitted light a thin layer of it appears bright yellow.

Rose[§] has called attention to various other reactions, in which suboxide of silver appears to be formed. Thus, if ammoniacal solution of nitrate of silver be added to photosulphate of iron, a deep and intensely colorific black precipitate is formed, consisting of a compound expressed by the formula $Ag_2O,2FeO, Fe_2O_3$. Similar or analogous products of different composition are formed by the use of salts of the manganous oxide, and by solutions of cobalt; but in all these cases the suboxide of silver is associated in combination with other bodies, and does not present itself in a state from which it would be easily convertible into a subchloride. Rose, indeed, has made, in connection with these researches, one remark which has a significance of some value for the photographic chemist. He shows that, in the case of adding the acetate of silver to a protoacetate of iron, the precipitate presents the black tint and deeply colorific power which seem to characterise the compounds of the suboxide of silver. When the salts used, however, contain "strong" mineral acids, as when nitrate of silver and sulphate of iron are the mutual precipitants, the deposit is grey and metallic—the reduction of the silver is, in short, complete. The significance of this fact we shall hereafter recall.

The processes which seemed to hold out the greatest prospect of success for the production in the first place of a suboxide, and subsequently of a subchloride, by the methods of the laboratory, and independently of the action of the light, were those afforded by the reduction[||] of the citrate of silver, and by the conversion of arsenite of silver[¶] by the action of a caustic alkali into alkaline arseniate, accompanied by a reduction of the oxide of silver to a mixture of metallic silver and suboxide, thus:—

$$3\,AgO\,AsO_3 + 3NaO\,HO = 3\,NaO\,AsO_5 + Ag_2\,O + Ag.^{*}$$

Of the results yielded by the first of these, none were found that gave any promise at all satisfactory. Hydrogen was passed through citrate of silver suspended in hot water. The products at first brown, and then black, and finally grey, were examined at various stages of their progress in colouration; citric acid being used as a solvent to remove the citrate and the oxide,[†] the residuary product being examined by treatment with dilute chlorhydric acid to convert it into chloride. The citric acid solution was found to contain nothing capable of reducing permanganate of potash, and must therefore have been free from suboxide. The result of treating the residue with chlorhydric acid, and then dissolving the silver by dilute nitric acid, was a rose-tinted chloride of silver.

On the supposition that this residue was a mixture of suboxide, or a salt of it, with metallic silver, we are constrained to the view that the suboxide of silver is not characterised by the property of entirely passing, under the influence of chlorhydric acid, into subchloride. This seems to be confirmed in some degree by the results with the arsenite, to which we now proceed. To that reaction, which Wöhler has described, much attention was devoted; and it was tried under several modifications.[‡] By forming a dilute solution of arsenite of silver in nitric acid, and adding this very gradually to a boiling concentrated solution of soda, an extremely black powder was produced. This on being treated with dilute chlorhydric acid becomes grey: and on boiling the washed product with dilute nitric acid, silver is dissolved, and there is left a substance, which, if Wöhler be right in calling the black powder suboxide of silver, we should expect to contain subchloride of silver. The colour of this substance is a rich chocolate or maroon, more or less dark, according to the nature of the process; it never reached the deep slate-violet of the chloride of silver exposed to sunlight. On analysis it was found to contain as large an amount as 24 per cent. of chlorine; the pure chloride Ag Cl contains 24·74 of chlorine; the subchloride Ag_2 Cl requires 14·08 of chlorine. Other products of less deep hue than the one first examined gave the numbers 24·3 and 24·2 per cent. of chlorine. Assuming that the chocolate hue was imparted to the substance by a subchloride (and no other view seems equally probable), we are constrained to recognise in this subchloride, only present to the amount, at the furthest, of 5 per cent., a surprising colorific energy.

From the experiments previously cited, we are disposed to think that our failure in this attempt to produce the pure subchloride of silver arose from the fact of the action of chlorhydric acid upon the suboxide of silver not being so simple as a complete conversion into subchloride would indicate; and we are the more induced to draw this conclusion from the analogy of the suboxide of mercury. Thus, if from a solution of the suboxide of mercury that oxide be precipitated, the action of chlorhydric acid on the precipitate is not to form the subchloride, but a grey mixture of chloride and metallic mercury. The same may perhaps apply to suboxide of silver; and, if so, it would be decomposed by chlorhydric acid, either partially or entirely, and would form chloride of silver and metallic silver.

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[*] Phil. Mag. xiv. 322.

[†] Chem. Soc. Quart. Journ. x. 74.

[‡] Quart. Journ. Sc. iv. 268.

[§] Journ. Pract. Chem. lxxi. 215, 407, *et seq.*; see also Wöhler, Pogg. Ann. xli. 344.

[||] Wöhler. Ann. Pharm. xxx. 3.

[¶] Wöhler, Ann. Chem. Pharm. cl. 363.

[*] The formula for arsenite of silver usually accepted is 2 AgO AsO_3, but we find Wöhler's formula as above given to be the correct one.

[†] The brown product became converted into the black one by the treatment with citric acid. Both underwent similar changes under the successive action of chlorhydric and nitric acids, and both previous to this treatment reduced the permanganate of potash powerfully. But it was found that the citric acid alone was capable of reducing the deposit to the grey condition of metallic silver, withdrawing from it at the same time (all the) oxide of silver, a result which seemed to render almost hopeless the effort to form the suboxide by its means.

Indeed the mere boiling of the citrate blackened it, producing a dark-coloured mixture of silver with some compound of the suboxide, the citrate itself undergoing a transformation which must have lowered its saturating power, as the solution remained neutral. The citrate, however, when thus boiled with water through which a stream of hydrogen was passing, became more darkly coloured, but imparted an acid reaction to the water.

The black body that results from the reactions described, contains organic matter, as it intumesces when heated. It cannot, therefore, be merely a mixture of metallic silver with the suboxide.

The dry citrate heated in a stream of hydrogen is very slowly affected at 212°, but passes at length into a substance, which produces on the one hand a dark-brown solution, and on the other a brown residue which yields a very pale red body on being transformed by chlorhydric and nitric acids.

[‡] It appeared, in trying Wöhler's experiment in several ways, that on the one hand it was extremely difficult to get rid of all the arsenic compound from the residue, and on the other, that the tendency of arsenic acid in solution was to further the breaking up of the suboxide into oxide and metal. Lime and baryta water were therefore substituted for the soda, but still arsenite of silver remained undecomposed. This seemed due to its solid condition. It was to overcome this that the solution in nitric acid was adopted.

It was found, however, that the chocolate-tinted compound of chlorine and silver, by whatever process it had been produced, became, by fresh treatment with chlorhydric acid, again capable of yielding a solution of silver when treated by nitric acid. So utterly unstable are these subcompounds of that metal!

Indeed, it would seem that to secure to them any permanence, they must be formed in combination.

One experiment we tried, in the hope of producing the subchloride of silver by a direct reaction. Chloride of silver is soluble in concentrated and highly-alkaline arsenite of soda; and this solution, in the presence of excess of soda, was gently warmed. A brilliant mirror-like deposit, not of sub-chloride, but of metallic silver, was the result.

But with however little success the efforts to produce a pure subchloride of silver have as yet been crowned, the experiments we have detailed enabled us to institute a few comparative reactions, whereby the result of treating a true subchloride (however diluted, so to say, with protochloride) with the ordinary reagents employed by the photographist may be achieved. The results yielded by these reagents were the following:—

Nitric acid, of sufficient strength to dissolve silver by heat, does not alter this dark compound.

Chlorhydric acid does not, when dilute, produce any apparent change in it.

Ammonia breaks it up entirely, dissolving all as chloride, except a minute amount of metallic silver, which remains.

Hyposulphite of soda dissolves all except a trace of metallic silver like that left by the ammonia.

It will hardly be worth while to go through the reactions exhibited by these several tests with the dark body formed by the photochemical decomposition of the chloride of silver, or of this body mixed with excess of nitrate; for we find that these reactions are in the several cases identical. The light-darkened chloride indeed presents a deeper and bluer colour than that formed artificially; but when it is considered that the light-formed body is a coating of uniformly and completely transformed substance—superficial, it is true, but continuous in its surface—while the laboratory product is an intimate mixture of discontinuous particles, the bluer tint of the one and the redder tint of the other will hardly carry much weight in deciding against the identity of the colorific silver-compound in each case. Nor will it perhaps be considered to support the view of the photochemical reduction consisting in the complete severance of the metallic silver, that the product of that reduction can be formed by the light in the presence of nitric acid. The production of an allotropic form of silver in the nascent state, in the presence of nitric acid, seems certainly to make a larger demand on the credulity of the chemist than the assertion that the reduction stops at an intermediate stage, at which a subchloride is the result of it—a subchloride whose properties we have seen to be identical with those of a substance formed in the laboratory, and to which it is difficult to assign any other composition than that of a subchloride of silver.

(*To be continued.*)

Dictionary of Photography.

Photoglyphic Engraving.—A process, invented by Mr. Fox Talbot, for engraving the photographic image on metal plates. It consists in coating a metal plate with gelatine containing bichromate of potash; upon this, the negative or object to be copied is placed, and exposed to the sun's rays in a printing frame. The time of exposure will vary with the intensity of the light. Wherever the light acts upon the sensitised layer of gelatine, it turns it from yellow to brown. The plate is not washed after the picture is impressed on it, but is covered with a little powdered copal resin, which is melted by placing the plate over the flame of a spirit-lamp. When cold, the plate is ready to receive the etching fluid, which consists of hydrochloric acid, saturated with peroxide of iron. This liquid penetrates the gelatine wherever the light has not influenced it, but refuses to act upon those parts which remain unchanged. The liquid acts with great rapidity. The etching is stopped by wiping off the fluid with a clean linen cloth, then rubbing the plate with soft whiting and water to remove the gelatine. The etching is then found to be completed.

Photography.—The art by which the images of objects received in the focus of the camera obscura are obtained by the action of light on sensitive media. The sensitive surface consists of silver in combination with chlorine, iodine, bromine &c.; the medium which contains this sensitive material may be paper, albumen, or collodion, or both. The nature of the action of light on these sensitive surfaces is at present but imperfectly understood. The most rational explanation is, that a reduction of silver, proportionate to the intensity of the chemical action of light, is effected. This action remains invisible in the case of iodide of silver, until it is developed by certain reagents, which set up a peculiar force, termed molecular attraction, and effect the reduction of the salt of silver; these reducing agents are solutions of gallic and pyrogallic acid, sulphate and nitrate of iron. After the picture is developed by any of these agents, it requires to be fixed; that is, washed with some substance in solution capable of dissolving out the salts of silver that have not been acted upon by light, which, if allowed to remain, would become dark, and the picture merge in the darkening, and become lost.

(*To be continued.*)

A Catechism of Chemistry.

◆

LIGHT.

Q. Is our acquaintance with the fundamental laws and properties of light of use to the chemical student?

A. In the present position of chemistry, such an acquaintance is almost indispensable, as frequently the physical actions of a body on rays of light are the best means of estimating its chemical properties or constitution.

Q. Give an illustration of this.

A. The genuineness of an essential oil, for instance, is most frequently decided by means of its refractive power on light, different oils having different properties in this respect. The varieties and proportions of sugar in complex organic liquids are, in many cases, only to be decided by the different actions which they exercise upon polarised light.

Q. Is the action of light of other chemical importance besides that in the instances just mentioned?

A. It is. Forty years ago the chemical action of light was unknown; now it is found to be the mainspring which maintains the chemical actions, and with them the existence, of the myriad forms of organic life on the globe.

Q. In what manner is this the case?

A. The most important action of solar light is its power of causing plants to decompose carbonic acid, and assimilate the carbon. Light, therefore, is the cause of all vegetable growth, and hence the accumulation, in ages past, of coal for our present use as fuel, and of material in the form of timber for building purposes. Animal life also, being supported by the vegetable world, is in this manner seen to be directly dependent upon this decomposition of carbonic acid by the agency of light. It was an ingenious and far-seeing speculation of, we believe, the elder Stephenson, that the original source of the power of steam-engines was the sun, whose beams furnish the energy which enables vegetables to decompose carbonic acid, and thus to form a store of combustible compounds, afterwards to be used as fuel.

Q. Is light capable of acting in other ways on the inorganic kingdom as well as the organic?

A. It is. The art of photography is one of the most striking and complete illustrations of this action of light on the mineral kingdom. On this account it is necessary, in any complete course of chemical instruction, to draw the student's attention to some of the principal properties of light, in order to enable him fully to appreciate the chemical effects which it induces. The investigation of the laws of light belongs to the science of optics, and forms no part of our present plan of instruction.

Q. What are the usual sources of light?

A. Besides the great fountain of light—the sun, whose beams come to us both direct and reflected, as in diffused daylight and moonlight—there are several modes of procuring light by artificial means.

Q. State the most common method employed.

A. The usual mode of procuring artificial light is by an elevation of temperature. All solids when raised to a certain temperature (about 1,000° F.) become luminous.

Q. Do not gases also become luminous when subjected to a high temperature?

A. They do not to any great extent, and not at all, except raised to a far higher temperature than the one just mentioned.

Q. How, then, is it that light is produced by the combustion of gas?

A. The *complete* combustion of gas hardly evolves any light whatever. It is only when the carbon is separated in the flame as a solid body that any light is evolved. The light proceeds from the solid carbon raised to a high temperature by the burning gas. The intense and beautiful lime light depends upon the same thing. When the jet of mixed gases is burning in the air, there is hardly any light whatever seen, although the temperature of the flame is far beyond the hottest furnace. When, however, a piece of lime is introduced into the flame, it becomes incandescent, and glows with a brilliancy which the unprotected eye is unable to bear.

Q. Are there other sources of light?

A. Yes. Some bodies emit light spontaneously, and many others shine when gently heated or rubbed. Such bodies are called phosphorescent. Many animal and vegetable compounds, in a state of incipient putrefaction, likewise become luminous in the dark.

Q. What other means are there of producing light?

A. Chemical action is a very frequent source of light. The brilliant electric light, which almost rivals the sun in splendour, is another kind of light which is now about to be utilised for public purposes, and more especially for lighthouse illumination. Crystallisation also sometimes gives rise to an evolution of light. This is especially seen when the transparent form of vitreous arsenious acid is dissolved in hot hydrochloric acid and allowed to cool. As it cools, crystals of opaque, white arsenious acid are deposited, and, if the process is conducted in a dark room, the separation of each crystal will be seen to be accompanied by a faint flash.

Q. What is the usual theory with respect to the cause of light?

A. The theory which is almost universally admitted amongst philosophers at the present day, is the one called the *undulatory theory*.

Q. What is this?

A. According to this theory, light is supposed to result from the undulations of a highly-elastic medium of inconceivable tenuity, filling all space, and the interstices of all material objects. This medium is not light itself, but is supposed to be capable of being thrown into vibration by any luminous body. The advantages of this theory are that the different phenomena of light are thus rendered strictly analogous to those of sound, which are known to arise from atmospheric undulations, and are thus rendered more directly appreciable to common apprehension.

Q. Are there any general facts connected with the transparency of bodies which are useful to remember?

A. It is necessary to bear in mind that the terms *transparent* and *opaque* are only of relative significance. The most transparent bodies in nature obstruct considerable quantities of light; and, on the other hand, the most opaque substances may be shown to allow light to pass through them.

Q. Give illustrations of these statements.

A. Atmospheric air, even when apparently purest, obstructs immense numbers of the sun's rays. Dr. Young has calculated that when the sun is on the horizon, and its rays thus passing through about 200 miles of air, only $\frac{1}{2000}$th part are enabled to come through. This is also well seen in an eclipse of the moon. Before the shadow of the earth has reached the moon, the diminished brilliancy of our satellite caused by the intervention of the earth's atmosphere is clearly noticeable on its surface. A column of pure water also obstructs a large amount of sunlight, seven feet in thickness absorbing one-half of the total number of incident rays.

Q. How can it be shown that bodies commonly considered to be opaque, are transparent?

A. The metals are the densest and most opaque bodies known; and yet these can be beaten out into films so thin that light will pass through. Gold can be beaten out into the ordinary form of gold leaf, which, if held up to a strong light, allows a green light to pass. These can be still further diminished in thickness, until the film of the gold is as transparent as glass. We have seen and experimented with films of solid gold, which were so thin as to be almost invisible, and as transparent as the most perfect sheet of glass. The yellow colour of gold is absent in these excessively thin films; in fact, the film is sometimes only to be seen at all by placing it over a sheet of white paper, when its presence may be known by the appearance which it presents of an almost perfectly transparent pale brown stain.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 16th July, 1860.

The question of magnifying positives and negatives is still being agitated in the photographic circles here. First, Mr. Woodward's process is discussed, then the modifications proposed by M. Bertsch, the experiments of MM. Bayard and Aguado, &c. But the most curious phase of this new photographic problem is, perhaps, that a certain M. Quinet, the inventor of a photographic apparatus termed a *quinetoscope*—which, being derived from the Greek, would mean an instrument in which to see M. Quinet!—has considered himself the sole inventor of these new magnifying apparatus, and has had those of other Parisian operators and photographic dealers seized by the police. A seizure is also about to be effected in all *ateliers* where orthoscopic lenses, or cameras having a certain number of lenses, are found, M. Quinet considering himself the sole rightful owner of the above. I have heard that there exists a remarkable difference between the English and the French law:—In England, to condemn a man, you must prove him to be a culprit; in France, to be acquitted, a man must prove himself innocent.

MM. Davanne and Girard lately took a sheet of dry waxed paper, that had been inclosed for a whole year in one of Marion's boxes, and, to their surprise, obtained a very tolerable proof upon it. The sheet had been, of course, sensitised before being placed in the box.

The same authors are about to publish a new method of fixing. It consists, essentially, of the following operations:—

1. The positive proof, after insolation, is passed through water to wash off all the free nitrate of silver.

2. It is then passed into water containing two or three per cent. of bicarbonate of soda. This operation is performed because the authors have found that, after the action of light upon a photographic paper, the latter contains free nitric acid—a fact which is conformable to theory—and the bicarbonate neutralises this free acid, which would otherwise decompose the hyposulphite of soda.

3. The fixing must take place rapidly, and as much as possible away from the influence of light: this is done by a piece of cardboard or wooden board being placed over the fixing bath to exclude the light. Experience has, indeed, taught us, that light decomposes the hyposulphite solution charged with salts of silver, precipitating sulphur and sulphide of silver.

4. Finally, the hyposulphite fixing bath may be used for a considerable number of proofs, but it must never be used twice, and it would not be safe to employ it two days successively.

M. Gershein has formed a useful alloy of copper, which resembles somewhat the amalgam of copper produced in 1848 by M. Pettenkofer, of Munich. Pure copper is first obtained by reducing oxide of copper by hydrogen, or precipitating the metal from some of its salts by zinc filings. 20, 30, or 36 parts of this pure copper are taken (according to the degree of hardness desirable); they are moistened well, in an iron or porcelain mortar, with concentrated sulphuric acid, of 1·85 sp. gr., and to the paste thus obtained are added 70 parts, by weight, of mercury; the whole is well stirred. When the copper is perfectly amalgamated with the mercury, the compound is washed with boiling water to dissolve all the sulphuric oxide; and, after cooling, the amalgam becomes, in eight or ten hours, hard enough to scratch tin and gold.

This amalgam is not attacked by weak acids, or by alcohol, ether, &c. It adheres firmly to every substance, whether they be metallic compounds or surfaces of glass or porcelain, and can be employed as a mastic or cement to join metals, &c. To this effect, it is rendered soft and pliable by heating to 375° (centigrade), and then heating it in a mortar heated to 125° (centigrade), until it has taken the plasticity and consistency of wax. The peculiar properties of this amalgam make it very useful for a variety of purposes, especially for soldering metals where heat cannot be employed, &c.

M. Langlois has published a paper upon the "action of iodine on a concentrated solution of cyanide of potassium." M. Langlois is one of our good chemists, and his note is very interesting. A very curious reaction takes place when iodine is placed in a solution of cyanide of potassium, which has been made with as little water as possible;—the iodine disappears as if by magic, and is as soon replaced by beautiful colourless prismatic crystals, which are iodo-cyanide of potassium. The crystals are constantly and rapidly obtained with a solution formed of one part of cyanide and two parts of distilled water. The reaction may be represented by the formula—

$$\mathrm{K\,Cy} + 2\,\mathrm{Io} = (\mathrm{K\,Io} + \mathrm{Cy\,Io}).$$

The iodo-cyanide is easily decomposed; water washes from it all the iodide of potassium; ether, on the contrary, leaves the iodide of potassium, and dissolves the iodide of cyanogen. It is decomposed by heat, evolving iodide of cyanogen, and, if the temperature be high enough, iodine vapours also (at a heat above 130° C). If these crystals be treated by water, and the solution evaporated, new crystals are obtained having the composition—

$$\mathrm{K\,Io}, 4\,\mathrm{Cy\,Io} + 8\,\mathrm{HO}.$$

These decompose pretty much in the same manner as the former.

M. Engelhardt, by some ingenious experiments made at Zinswiller (Bas-Rhin), has apparently cleared up the much-discussed question of "*ground-ice*," or the formation of ice at the bottom of rivers, pools, &c. He caused water placed in some iron boilers to freeze, and, when the surface of the liquid was frozen over, he broke the ice, and decanted off the remainder of the water; ice was then found to cover the sides and bottom of the boilers. This phenomenon is accounted for by the radiating power of the sides and bottom of the iron or wooden vessels in which the water froze. Such is not the case in lakes, &c. The maximum density of water is not at 0°, its freezing point, but 4° 44′ (centigrade), so that as soon as the water at the surface attains 4° 44′, down it sinks to the bottom of the lake, and the same phenomenon continues until the whole of the water is at 4° 44′; then the surface descends to zero and freezes. But if, as in rivers, torrents, &c., there is a movement of rotation—a whirlpool here and there—then the water at 0° of the surface is forcibly brought down to the bottom, and gives rise to ground-ice (*grundeis* of the Germans). This effect, according to our author, is especially owing to certain obstacles—such as stones, rocks, pieces of wood, &c.—which turn the water from its course, and cause it to rotate. However, ground-ice is never formed unless the cold of the atmosphere be very intense, and of a certain duration.

M. Engelhardt's first experiments on this subject were made in 1829. He has recently repeated them, and presented an account of them to the Academy of Sciences.

SULPHUR TONING.

To the Editor of the "Photographic News."

Sir,—In the letter from your Paris correspondent, which appeared in the last number of the "Photographic News," it is stated that an amateur, M. Verrier, has hit upon a method of toning with sulphur, to the exclusion of salts of gold. This method is by no means new; it was suggested some five or six years ago by M. H. Plaut, an eminent Parisian photographer. The formula given by M. Verrier is exactly the same as that prescribed by M. Plaut, and quoted by M. Sella, in his *Plico de Fotografo*, Torino, 1856. I have practised this method of sulphur toning on a very large scale, upon as many as a hundred prints a-day, in summer time; and long experience justifies me in saying, that its results are very satisfactory. The tones obtained varying in hue from reddish violet to deep rich purple, are fully equal to those yielded by gold. I have a large number of proofs toned in the sulphur bath, as long as two or three years ago, and I cannot distinguish them in any respect from those toned, at the same date, in the compound toning bath of chloride of gold and hyposulphite of soda. I was induced to adopt this method of sulphur toning, in consequence of the very uncertain and unsatisfactory results obtained from the use of the toning-bath, then most in vogue. I suspected that in *that* bath the sulphur had more to do with the toning than the gold, and experience soon verified the suspicion.

Sulphur toning is a delicate operation, and hardly likely to be successful in the hands of an operator unskilled in chemical manipulations; it requires a sharp eye, a keen nose, and much sleight of hand. The operation is conducted in the following manner:—

In 50 drachms of water, dissolve 90 grains of hyposulphite of soda, give the solution a rotary motion by stirring it briskly, then add 6 drops of sulphuric acid diluted with a drachm or two of water. Intimate mixture is secured by the rotary motion given to the solution, which, in a few seconds becomes milky, and a strong odour, like that of burning sulphur, is given off. Have ready, in a dish, the proofs previously washed to free them from the superfluous nitrate and chloride of silver, and soaked in a hypo. bath for half an hour; then immerse them, one at a time, in the bath prepared as indicated above. The toning commences instantly, passing through the usual hues of reddish-violet, violet, and purple, to black and olive-green; the gradation is very rapidly effected, and in one or two *seconds*, very fine violet and purple tones are attained. The proof must be removed from the bath just before it has attained the desired depth of colour, and plunged into a large vessel of clean water, to stop the further action of the sulphurous acid. If the proofs are allowed to remain an instant too long, they turn of a greenish-black, and the whites of the paper assume that sickly, yellow hue premonitory of rapid decay. A very little practice will enable an operator to conduct the process with certainty; and if properly managed, as few, or fewer pictures will be spoiled by this method of toning than by any other. The bath is very quickly exhausted, and as soon as its energy sensibly declines, which is shown by its slower action on the proofs, it should be thrown away, and a fresh one mixed, if required. It is a proper precaution to rinse the proofs in two waters, but beyond this, they require no further *fixing*.

This is a *quick* as well as a *sure* process of toning. The solution of hyposulphite of soda of the required strength can always be kept ready; so also can the sulphuric acid. Mixed together with the requisite quantity of water, a print may be toned, fixed, and dried in a few minutes, and in a permanent manner. The sulphuric acid introduced into the solution of hyposulphite of soda has the effect of eliminating a corresponding quantity of hyposulphurous acid—which is a very unstable compound, susceptible of spontaneous decomposition—it quickly resolves itself into sulphur and sulphurous acid. The hyposulphurous acid, composed of S_2O_2, separates into SO_2, into sulphurous acid, and S or sulphur.

If, at the moment this decomposition takes place, a proof be immersed in the solution, the sulphur in a nascent state combines with the reduced silver constituting the picture, forming sulphide of silver. But hyposulphurous acid is immediately liberated, and only sulphurous acid remains in the liquid; the condition of the bath changes, and its effect upon the proof is no longer the same. In the course of time the hyposulphurous acid itself disappears from the liquid, because it reacts upon the hyposulphite, and gives rise, probably, to tetrathionate, and to hyposulphite of soda. $3\,SO_2 + NaO, S_2O_2 = 2\,NaOS_4O_5 + NaO, SO_2$.

The quantity of sulphuric acid prescribed, viz., 1 drop to every 15 grains of hyposulphite of soda, must be strictly adhered to, else the result will not be such as is indicated. If the quantity be exceeded, the proofs will not be permanently fixed, because too large a quantity of sulphur will be liberated, and will render the proofs unstable, in spite of every precaution.

I have for several years adopted a method of securing the permanency of proofs toned in the usual way, by which, in a very simple and effectual manner, all traces of hyposulphite of soda are removed from the proof. After the toning and fixing are completed, and the proofs rinsed for an hour or so in running water, I immerse them in a dish of clean water, to which a few drops of sulphuric acid, just sufficient to impart a slightly acidulous taste to the water, has been added, stirring it well with the hand, to secure perfect mixture. I dip each print, and allow it to remain in the acidulated water for a second or two, and then withdraw it; upon applying it to the nose a smell of sulphur will be apparent, if any hypo. had been left in the paper, but which is now decomposed by the sulphuric acid, and the sulphur set free. Having ready another dish of water, in which some carbonate of soda has been dissolved, I immerse the proofs in that, to neutralise the adherent sulphuric acid, and afterwards rinse in clean water. Since adopting this method I have never been annoyed with faded proofs.—Yours, &c.,

Charles Martel.

KEIR'S EXPERIMENTS ON THE SOLUTION OF METALS IN ACIDS.

EXPERIMENTS AND OBSERVATIONS ON THE DISSOLUTION OF METALS IN ACIDS, AND THEIR PRECIPITATIONS; WITH AN ACCOUNT OF A NEW COMPOUND ACID (MENSTRUUM), USEFUL IN SOME TECHNICAL OPERATIONS OF PARTING METALS. BY JAMES KEIR, ESQ., F.R.S.[*]

Section II. On the alterations which iron or its surface undergoes by the action of a solution of silver in nitrous acid, or of a pure concentrated nitrous acid.

It has been said, that when iron is exposed to the action of a phlogisticated solution of silver it instantly precipitates the silver; is itself acted upon or dissolved by the acid solution during a certain time, longer or shorter, according to the degree of phlogistication, quantity of superabundant acid, and other circumstances; and that, at length, the solution of the iron ceases. The silver precipitate is re-dissolved if there is superfluous acid: the liquor becomes clear again, but only rendered a little browner by its having dissolved some iron; while the piece of iron remains bright and undisturbed at the bottom of the liquor, where it is no longer able to affect the solution of silver.

I poured a part of the phlogisticated solution of silver, which had passed through these changes, and which had ceased to act upon the piece of iron, into another glass, and dropped another piece of fresh iron wire into the liquor, upon which I observed a precipitation of silver, a solution of part of the iron, a re-dissolution of the precipitated silver, and a cessation of all these phenomena, with the iron remaining bright and quiet at the bottom of the liquor as before. It appeared, then, that the liquor had not lost its power of acting on *fresh* iron, although it ceased to act on that piece which had been exposed to it.

To one of the pieces of iron which had been employed in the precipitation of a solution of silver, and from which the solution—no longer capable of acting upon it—had been poured off, I added some phlogisticated solution of silver which had never been exposed to the action of iron, but no precipitation happened. It appeared, then, that the iron itself, by having been once employed to precipitate a solution of silver, was rendered incapable of any further action on any solution of silver; and it is to be observed, that this alteration was produced without the least diminution of its metallic splendour, or change of colour. The alteration, however, was only superficial, as may be supposed, for, by scraping off its altered coat, it was again rendered capable of acting on a solution of silver. To avoid circumlocution, I shall call iron thus affected, *altered* iron; and iron which is clean, and has not been altered, *fresh* iron.

To a phlogisticated solution of silver, in which a piece of bright, altered iron lay, without action, I added a piece of fresh iron, which was instantly enveloped with a mass of precipitated silver, and acted on as usual; but, what is very remarkable, in about a quarter of a minute or less, the altered iron suddenly was covered with another coat of precipitated silver, and was now acted on by the acid solution like the fresh piece. In a little time the silver precipitate was re-dissolved as usual, and the two pieces of iron were reduced to an altered state. When a fresh piece of iron was then held in the liquor, so as not to touch the two pieces of altered iron, they were nevertheless soon acted upon by the acid solution, and suddenly covered with silver precipitate as before; and these phenomena may be repeated, with the same solution of silver, until the superfluous acid of the solution becomes saturated by the iron, and then the re-dissolution of the precipitated silver must cease.

I poured some dephlogisticated nitrous acid on a piece of altered iron without any action ensuing, although this acid readily acted on fresh iron; and when, to the dephlogisticated nitrous acid, with a piece of altered iron lying immersed in it, I added a piece of fresh iron, this immediately began to dissolve, and soon afterwards the altered iron was acted on also by the acid.

I poured upon a piece of altered iron a solution of copper in nitrous acid; but the copper was not precipitated by the iron, neither did this iron precipitate copper from a solution of blue vitriol.

Altered iron was acted on by a dilute phlogisticated nitrous acid, but not by a red concentrated acid, which is known to be highly phlogisticated.

I put some pieces of clean, fresh iron into a concentrated and red fuming nitrous acid. No apparent action ensued, but the iron was found to be altered in the same manner as it is by a solution of silver; that is, it was rendered incapable of being attacked either by a phlogisticated solution of silver, or by dephlogisticated nitrous acid.

Iron was also altered by being immersed some little time in a saturated solution of silver, which did not show any visible action on it.

The alteration thus produced on the iron is very superficial. The least rubbing exposes some of the fresh iron beneath the surface, and thus subjects it to the action of the acid.

It is, therefore, with difficulty that these pieces of altered iron can be dried without losing their peculiar property. For this reason, I generally transferred them out of the solution of silver, or concentrated nitrous acid, into any other liquor, the effects of which I wanted to examine; or they may be transferred first into a glass of water and thence into the liquor to be examined; but it is to be observed, that if they are allowed to remain long in the water, they lose their peculiar property or alteration. They may be preserved in their altered state by being kept in spirit of sal-ammoniac.

To a saturated solution of copper in nitrous acid (which was capable of being readily precipitated by fresh iron), I added some saturated solution of silver. From this mixture a piece of fresh iron neither precipitated silver nor copper; nor did the addition of some dephlogisticated nitrous acid effect this precipitation.

A solution of copper, formed by precipitating silver from nitrous acid, by means of copper, was very reluctantly and slowly precipitated by a piece of fresh iron; and the iron thus acted on by the acid was changed to an ochre.

A saturated solution of silver having been partly precipitated by copper, acquired the property of acting upon fresh iron, and of being thereby precipitated.

Fresh iron immersed some time in solutions of nitre of lead, or of nitre of mercury in water, did not occasion any precipitation of the dissolved metals, but acquired an altered quality. These metals then, in this respect, resemble silver.

It is well known that a solution of gold in aqua regis precipitates the gold in its metallic state. I do not recollect that the precipitation of a solution of silver by the same martial vitriol has been observed. However, upon pouring a solution of martial vitriol into a solution of silver in the nitrous acid, a precipitate will be thrown down, which acquires in a few minutes more and more of a metallic appearance, and is, indeed, perfect silver. When the two solutions are pretty well concentrated, a bright argentine film swims on the surface of the mixture, or silvers the sides of the glass in which the experiment is made. When a phlogisticated solution of silver is used, the mixture is blackened, as happens generally to a solution of martial vitriol, when a phlogisticated nitrous acid is added to it.

I added about equal parts of water to a mixture of a phlogisticated solution of silver and a solution of martial vitriol, in which *all* the silver had been precipitated, and dissolved the diluted mixture with heat, by which means most of the precipitated silver was re-dissolved. Bergman has observed a similar re-dissolution of gold precipitated by martial vitriol, upon boiling the mixture, but he attributes the re-dissolution to the concentration of the aqua regis by the evaporation. As this explanation did not accord with my notions, I diluted the mixture with water, and found that the same re-dissolution occurred, both with the solution of silver and with that of gold. But with neither of the metals did I find that the re-dissolution ever took place, unless there had been a superabundance of acid in the solutions of gold and silver employed.

Mercury is also precipitated in its metallic state from its solution of nitrous acid by a solution of martial vitriol. When the liquor is poured off from the precipitate, this may be changed into running mercury by being dried near the fire.

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[*] Concluded from vol. iv. p. 131.

I found, also, that silver may be precipitated in its metallic state from its solution in vitriolic acid, by addition of a solution of martial vitriol. A vitriol of mercury may also be decompounded by a solution of martial vitriol, and the mercurial precipitate, which is a black powder, forms globules when dried and warmed.

Luna cornea is not decompounded by martial vitriol; consequently, there is no operation of a double affinity. Nevertheless, this luna cornea may be decompounded by the elements of martial vitriol, while they are in the act of dissolution; that is, the silver may be precipitated in its metallic state by dissolving luna cornea with a dilute vitriolic acid, to which some pieces of iron are added. And it is to be observed that this reduction of the silver and precipitation takes place while the acid is yet unsaturated. Marine acid and iron applied to luna cornea effect the same reduction of the silver to a metallic state, even when there is more acid than is sufficient for both metals.

The explanation of these phenomena will be attempted in the subsequent papers, which I propose to present on this subject to the Society.

Photographic Notes and Queries.

POSITIVE PRINTING.

Sir,—As one of the readers of your valuable journal, I shall feel obliged if you will kindly reply, in your next number, to the following inquiries:—First, as to the best printing process for large *vignetted* portraits on *plain* paper. The paper I usually use is the papier Saxe, but I find considerable difficulty in freeing the plain parts of the paper from the silver salts, where any defects, of course, show infinitely worse than on the printed portions; are these salts rendered more permanent in the paper during the toning? And if so, what is the best plan to adopt to free the paper with the greatest certainty? I have often used the ammonio-nitrate process, toning with sel-d'or; but I find, unless acid be added to the toning-bath, the prints are very liable to get a faint yellow tone in the lights, however quickly toned, and if toned slowly, this defect is often worse still. Besides this, I find, if acid be added, that the prints, however carefully washed and finished, fade, especially in damp weather, or in a damp climate; often with great rapidity. I have lately adopted the alkaline-gold bath, made with chloride of gold; but, as the pictures by this process require to be much over-printed, it is difficult for vignettes, as the light parts of the paper are very apt to get coloured from long exposure. Under these circumstances, could you advise me any better method of printing and toning? If so, kindly insert the formula in your next number. Yours respectfully, An Artist.

[Proofs on foreign plain paper are generally very unsatisfactory; they are better on English paper, on account of the hard sizing introduced into it. Hollingsworth's is a very good make. Printing processes have been so frequently described in the pages of the "Photographic News," that it can hardly be necessary to recapitulate them. If acid be left in the proofs they will surely fade, but it will be easy to neutralise the acid by an alkali, as carbonate of soda. We do not find the difference in the collodions of different makers that you complain of. Operators constantly obtain good pictures with the very collodions you condemn. Add as much loaf sugar as nitrate of silver to your bath, first dissolved in as little water as possible; it will probably obviate the inconvenience attendant upon the collodion you prefer.]

POITEVIN'S COLLODION PROCESS.

Sir,—In this process, given in your No. 88, there are some points worthy of consideration. The great trouble with most photographers is the nitrate bath. M. Poitevin gets rid of this by putting the nitrate of silver into the collodion, and sensitising in a bath of iodide of potassium. This, you will perceive, is a radical change in the collodion process; and, from the experiments I have already made, I am inclined to think very favourably of it. I proceed as follows:—To good, plain collodion I add a saturated solution of nitrate of silver in alcohol, to the extent of 1½ per cent.=6½ grains to the ounce. Coat the plate in the usual manner; immerse it in a bath of 2 to 3 per cent. of iodide of potassium; wash freely in distilled water. We have now an insensitive iodide of silver in the film, as it is formed in presence of an excess of alkaline iodide. It is rendered sensitive by immersion in a bath of nitrate of silver—strength of 20 grains to the ounce. Exposure and development are the same as in the usual method. This process is a little more troublesome, inasmuch as it requires two baths, instead of one; but its superior advantages will, I think, be manifest in the dry process. The alcoholic solution of nitrate of silver contains about 10 per cent. of that salt; it is easily prepared by adding 45 grains of nitrate of silver to 1 ounce, per weight, of alcohol, sp. gr. 847.—Yours, &c., A Templar.

TO CORRESPONDENTS.

Melhuish's New Objective.—In our notice of Mr. Melhuish's new lenses, of last week, we omitted to mention that the lens described was the ½-plate size, and also to add that combination 3 has great depth of focus, and is admirably suited for interiors.

Photo.—1. Intensify with hydrosulphate of ammonia, as described in the "Photographic News," vol. iv., p. 26. 2. The focus of a lens is its distance from the ground glass when an image is formed there of a distant object, as the sun or the moon. The focus varies with the distance of the object from the lens. 3. Mr. Maxwell-Lyte's formula will accomplish what you require. 4. The book reviewed in the present number of the "Notes." 5. The cost of a condenser would be about 10s. or 12s. 6. The agent is in Liverpool. 7. All the back numbers of the "Photographic News" are in print, and may be obtained upon application.

W. D. B.—You can send stereographs by book post for 4d. per lb. Stop out the skies on the varnished side of the negative: this can be done by taking a positive on thin paper, and cutting out the sky at the horizon very carefully, and then gumming or pasting it *in situ* on the negative. It is an operation that requires some care.

W. Kenyon.—1. It is not at all likely you will succeed in converting a positive into a negative. You can buy positive collodion. 2. If you keep your jar of cyanide covered up, we do not suppose it will do any harm. Perhaps your bath becomes exhausted of silver after a month's use. Test it, or replenish it with a stronger solution than originally made.

Neutral Tint.—We do not suppose you would like the pure black tones, even if you could obtain them: deep purple and violet tones are more agreeable to the eye. Indian ink yields reddish-black tones of grey, and is much preferred to the imitation of that pigment, which is pure black, but yields very cold, unpleasing tones of grey.

Orfo.—Photography is quite as remunerative, in proportion to the talent engaged in it, as any other profession. Mediocrity must not expect to carry off the laurels or the gains. It is better to begin with some mechanical application of the art, which does not demand high artistic knowledge, leaving portraiture and landscape for the last stages of experience.

A. T.—Wash your proofs in pure water, on removing them from the printing-frame; afterwards, in water containing a little carbonate of soda, to neutralise what free nitric may remain in the paper. Washing in salt and water is of no use whatever.

Bandon.—In our reply to your question, a fortnight ago, we stated that rolling-presses for photographic purposes were not manufactured in this country. We hasten to correct the error, by stating that such presses are manufactured by Mr. Francis, Great Russell Street, Bloomsbury, W.C.

Osmond, J.—We fully agree with what M. Bertsch has advanced respecting the future of photography. There can be no doubt that when a practical application is made of the principles he has enounced, photography will undergo a complete revolution.

Cyano.—There is nothing new in the method published by M. Vernier for weakening over-printed positives; every experienced photographer resorts to cyanide of potassium and ammonia for that purpose, applying the compound to the proofs after they are fixed.

J. H.—You will find Petzval's formula, or, rather, as much of it as he chose to communicate, in the "Photographic Society's Journal" for January, 1859. We cannot reprint it for your special benefit.

Ionic.—Architectural photographs are best taken on a large scale when there is a considerable amount of detail in the object; 15 inches by 12, at the least.

R. S. T.—There is no occasion for us to repeat formulæ which have already been given in the "Photographic News." Consult the back numbers, and you will find all you require.

G. H.—The loss of density in your negative may arise from various causes, among which are over-exposure, on the employment of fused nitrate of silver in the bath, or alkaline collodion.

Humber.—The size of picture you can take with your lens will depend upon the length of its focus, about two-thirds of the latter; *e.g.*, if the focus is 15 inches, the picture may be as much as 10 inches square.

Halyard.—You must not expect a new process every week: it takes a long time to perfect old ones; and a week seldom passes without a step being made in the way of improvement.

H. A. Z.—The most an author can do is to put you on the right track of study. Success will depend on your intelligence and application, united with experience.

G. C.—The bellows are usually made of roan or morocco leather. The camera may be cut, or not, as you prefer.

A. T. T.—We shall require specimens of your method before venturing to pronounce an opinion of its merits.

Preston.—The process you describe appears to be more curious than useful; better results are obtained with far simpler means.

O. O.—We suspect you have deceived yourself as to the cause of the phenomenon. It is not at all consistent with known chemical laws.

Stewart.—It would be invidious on our part to pronounce an opinion. Consult a practical photographer.

N. R. R.—The address of the Secretary of the Architectural Photographic Association is 9, Conduit Street, Regent Street.

Focus.—In the limited space within which you operate, it will be necessary to employ a lens of very short focus; say four or five inches.

H. L.—Your positives require to be greatly over-printed, for they lose much strength in the toning and fixing-baths.

O. T.—We prefer Soehnee's varnish for negatives that are much used for printing.

An Architectural Draughtsman.—Photography would be of great assistance to you in obtaining true perspective.

Sweet Wort.—You had better try the malt preservative process yourself, and report the result.

News.—We shall feel obliged by your supplying the information, it will doubtless be new to most of our readers.

A. Z.—Common pipe-clay answers as well as kaolin, and is much more easily obtained. We have found fuller's earth to answer very well.

V. V.—Chloride of calcium is the best material for absorbing the moisture in the box It may be procured at any operative chemist's.

⁂ All editorial communications should be addressed to Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard, London, E.C

THE PHOTOGRAPHIC NEWS.

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COLOUR IN ITS RELATION TO PHOTOGRAPHY.*

BY CHARLES MARTEL.

Colour has a marked influence upon our notions of the size and form of bodies, which is but too little appreciated by the photographic artist; consequently, the harmony of his pictures is frequently marred, or destroyed, from the want either of the recognition of this influence, or of making allowance for it. If we take two cubes of wood, both of exactly the same dimensions, and paint one white, or some luminous colour—as light-blue, green, yellow, orange, or red—and the other black, or a sombre colour—as deep blue, sea-green, purple, or indigo—the first cube will appear much larger than the second, provided each be placed in a strong light of equal intensity. This effect is the result of a radiating power possessed by luminous colours and by white, which apparently enlarges the outlines of objects, so coloured, to the eye.

A person clothed in black garments, or in those of dark or sombre colours, will appear smaller than when arrayed in white, or in bright colours. A light background to a portrait in which dark tones prevail, will have the effect of diminishing the apparent size of the figure, and weaken and confuse its outlines; for the radiation from the light surface will spread over the darker image, and even overpower the effect of contrast of tone.

In photographic portraiture, white should be very sparingly introduced; and those photogenic colours also which are rendered white in the photographic picture. With very trifling exceptions, it will be found that the white light reflected from glossy surfaces, even when they are black, or of non-photogenic colours, will produce all the variety of tone in the drapery of a portrait sufficient to secure harmony of light and shade. The variety of tone given by a black or yellow satin dress, if not too strongly illuminated, is productive of a very picturesque effect in a photographic picture, which the intelligent artist will not fail to turn to good practical account.

In photographic landscapes we frequently see a good picture marred by the intrusion of a white object, the effect of which is to heighten the contrast of the surrounding dark parts, and cause the tone, already too dark, to appear darker by the contrast. For this reason, still-water, from the surface of which all the incident light is reflected, seldom appears with a good effect in the photographic landscape; when, however, terrestrial objects are reflected in it, of course the discordant effect is modified, and sometimes entirely neutralised. A white-washed cottage, or a light-coloured stone building, upon which the sun is shining, will produce a spotty-effect in a picture so entirely destructive of harmony of tone, that views in which it occurs are utterly worthless, and even offensive, in a pictorial point of view.

One of the chief difficulties in photographic landscape is the management of skies. When they are "stopped out," so as to appear white, as most frequently happens, the harmony of the picture is completely destroyed. As the sensitive film will seldom admit of a good sky being printed from it, some such expedient as "stopping out" must be resorted to, although it is but an exchange of evils. The effect of a large mass of white sky in a picture is to lower its tone by contrast—a result the very reverse of desirable, inasmuch as the tone is generally too low, without being rendered more so artificially.

To overcome the defects of "stopping out," we have had recourse to the following expedient:—We first take a positive, and then carefully cut out the sky at the horizon, and around such objects as may impinge against it, and fasten it, *in situ*, on the negative. A positive now taken will exhibit a white sky; if the proof be then covered up with that portion of the first positive taken from which the sky was removed, carefully meeting the outline of the sky, and then exposed to the light, the sky will gradually darken, assuming such depth of tone as may be adapted to insure harmony in the picture. Other over-light portions of the picture may be treated in a similar manner, and the objectionable effect of spottiness, or glaring masses of high light, be greatly modified and subdued.

So long as the photographer's productions are limited to monochromous colour, it behoves him to spare no effort in obtaining the best hue the materials employed will afford. At present he can command an extensive range of *violets*, more or less red or blue, and *purples* of similar variety of hue; together with various reddish-browns, which more or less resemble the pigments—umber, bistre, and sepia. A faint yellow tinge in the whites secures greater harmony by softening the violent contrast between the light and dark parts. Not content with the rich variety of hues at present under command, there is a craving for pure blacks, on the supposition that photographic pictures printed in that colour, would more nearly resemble engravings; but this result would be modified by the peculiar albumened surface of the proofs, and it may be questioned whether pure black tones would prove so pleasing as at present anticipated. They would, doubtless, appear very *cold* in hue, and not at all comparable with the deep purple hues. It is well understood that the preference given to China-ink is due not to the pure black tones it yields, but to the fact that it gives an infinite variety of warm tones, which, if they can be called black, are greatly modified by small quantities of red or yellow. The most pleasing hues are, in our estimation, the deep hues of violet, so deep as to be nearly black, but being modified in hue by the presence of red, are more pleasing than pictures printed in pure black would be.

In portraiture, there is one class of subjects from which it is impossible to obtain satisfactory results—this is, the fair-haired type, which presents hair of a very pale orange-brown colour, blue eyes, and whose skin is of a lower tone of orange varied with red. It is obvious, that a photographic picture of this type must be so much lower in tone as to entirely misrepresent the complexion, &c., of the original, while the eyes will appear as if the object were blind.

The cause of the general absence of harmony in photographic compositions depends upon an endeavour to introduce too great a number of objects that are heterogeneous, or that differ too much from each other. The eye seeks repose—for some object pre-eminent among others upon which it may rest; but the other objects will intrude, and distract the attention. The same effect results when too great a variety of colours, or too great a contrast of light and shade, prevail in a composition. Good taste will be manifested in attaining a pleasing result by the simplest means.

We shall conclude these observations by a general remark, which is, that in every picture of small dimensions, the colours, as well as the objects themselves, must be so selected and arranged as to avoid what is called *spottiness*. For want of a proper distribution of objects and accessories, confusion will inevitably result; and this is more intolerable in small pictures than in large ones, where the eye, not being able to embrace the whole subject at once, may dwell satisfactorily on certain portions of it. The great bane of photography is a love of complexity: it manifests itself in the needless multiplication of processes and formula: it prevails in portraiture, where the backgrounds are crowded with useless accessories. Now it should be borne in mind that the grandest effects are more easily attainable by simple than by complex means. It is of far higher importance to secure a graceful attitude in a portrait, than to represent a superabundance of ornaments. The photographer must not expect to arrive by intuition at the knowledge of the principles that should direct his labours. Study, earnest and long continued, will be required to perfect the artist photographer, no less than the painter, the sculptor, or the architect. The range of his studies will be less extensive, inasmuch as he can dispense with the difficult and complex study of the laws of harmonious colouring, except he aspires to become a colourist. But with the principles of form and chiar-oscuro he must make an intimate acquaintance, if he desires his productions to soar above mediocrity.

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* Continued from vol. iv. p. 134.

(*To be continued.*)

GENERAL OBSERVATIONS ON PHOTOGRAPHIC POSITIVES.*

BY MM. DAVANNE AND GIRARD.

The study of fixing positive proofs is so complicated, that the chemist cannot hope to embrace all its various peculiarities in one view. Besides, he is always in fear that some accessory phenomenon may disguise the most important reactions, and lead him to erroneous conclusions.

Influenced by an appreciation of this kind, based upon given experiments, we introduced certain conclusions into our last chapter on fixing, which we find it necessary to modify.

While occupied in considering the rapid decomposition hyposulphite baths undergo, it will be remembered that we fixed the limit of saturation at a very low figure: this conclusion, derived from experiments falsely interpreted, must now be modified, and if the limit of saturation of hyposulphite can effect the fading of proofs, other causes act at the same time, the examination of which, hitherto neglected, must nevertheless claim our most serious attention.

First, we may remark that besides the substances we have already specified, we also encounter a certain quantity of free nitric acid, of which it is easier to account for the origin than to demonstrate its presence. We know that the chloride of silver reduced by light, disengages some chlorine, which, reacting upon an equivalent quantity of free nitrate, forms fresh chloride of silver at the same time that it sets free the nitric acid that the latter contains. It is to the successive reactions thus produced that the depth of the photographic image is due. Besides, it is easy to prove the presence of this free acid. It is only necessary to take a sheet of positive paper, divide it into two portions, and expose one to the light of the sun till it becomes darkened, and keep the other in the dark, and then examine the nature of the soluble products each piece contains. If each of them be immersed in a small quantity of water, and tincture of litmus be added to the two filtered liquors, we may easily recognise by the red colour assumed by this test-liquor that the solarised portion of the paper contains free nitric acid, while the other portion, which has not been exposed to the light, shows clearly that it contained no acid before solarisation.

Doubtless, washing the proofs in water removes the greater portion of the acid, but the decomposing energy of this agent upon one of the commonest fixing solutions, hyposulphite of soda, is such, that it appears more prudent, as will soon be shown, to make use in every case of a weak alkali to saturate the minutest quantities of acid that resist the washing in water.

We will now recur to the fixing itself, and especially occupy ourselves with hyposulphite of soda: as the action of ammonia, as well as that of cyanide of potassium, has been described in our preceding researches.

When a proof is fixed by means of a new bath of hyposulphite of soda, as experience shows, the fixing is excellent, and analysis proves that *the fixing agent has not imparted to the proof the least substance that can change it, either at present or in the future.*

But this result, so clear and precise, is injuriously modified in a certain number of cases, which may be comprehended in the four following:—

1st, The presence of free nitric acid in the printed proof.

2nd, The limit of saturation of hyposulphite of soda by the salts of silver.

3rd, The action of light.

4th, The use of baths intentionally acidified, as with acetic acid.

Presence of nitric acid.—As already shown, the printed proof, on being removed from the printing frame, contains a certain quantity of nitric acid; it is easy to foresee the influence this acid must exercise upon the solution of hyposulphite of soda; it is shown by the following reaction:—

$$S_2O_2,NaO+NO_5=NO_5NaO+SO_2+S.$$

The nitric acid decomposes the hyposulphite, saturates the soda, and sets hyposulphurous acid free; but the latter, whose instability is well known, is immediately resolved into sulphurous acid and sulphur. The first of these substances is without influence, but not so the second; precipitated in the very substance of the paper, it produces an element of destruction, which, if it does not act immediately, nevertheless combines ultimately with the silver to form that yellow compound—that golden sulphide, whose part in producing fading of the proofs, our preceding researches have established.

The presence of free nitric acid in the printed proof, and the powerful action it exercises on the hyposulphite, require that the photographer should take fresh precautions. Accustomed, up to the present time, to wash his proofs on their removal from the pressure frame to remove the excess of nitrate of silver upon them (a plan the excellence of which we shall soon show the efficacy), it is also necessary that he should submit them to the action of a substance capable of saturating the free acid the water has failed to remove. Bicarbonate of soda will immediately occur, as being the best reagent to be employed to obtain this result. It is to it, then, that the photographer will have recourse to avoid the new danger we have pointed out. After washing the proofs in water so as to remove all the free nitrate, it will suffice to leave them for a few minutes in an aqueous solution of bicarbonate of soda, of the strength of 2 or 3 per 100; or rather, to simplify the matter, to add this proportion of the soda to the hypo. bath. Saturated in this way, at the moment the liquid penetrates the sheet, the nitric acid can no longer exercise any injurious action on the proof.

Limit of saturation of the hyposulphite.—We now approach the most difficult and delicate part of the subject we are engaged upon. Every photographer knows that when we cautiously throw a certain quantity of dissolved nitrate of silver into a solution of hyposulphite of soda, a white precipitate appears, which is immediately dissolved: this precipitate is hyposulphite of silver—AgO,S_2O_2. It is a very unstable body, insoluble in water, and which, immediately it finds itself in the solid state, is decomposed into sulphide of silver and sulphuric acid, according to the following formula:—

$$(a)\ AgO,S_2O_2+HO=AgS+SO_3,HO$$

This body can combine with hyposulphite of soda (as takes place when it is dissolved in it), and give rise to two salts possessing very different properties. The one, which first forms, that is to say, when the hyposulphite is in excess, corresponds to the formula—

$$(AgOS_2O_2)(NaOS_2O_2)_2$$

This is a white salt, very soluble in water, undergoes no change in the light, and can only be obtained in the crystalline state by precipitation from its aqueous solution with alcohol.

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* Continued from vol. iii. p. 298.

The second, which is formed when the hyposulphite of soda is in a relatively less quantity than the nitrate of silver, corresponds to the formula—

$$AgOS_2O_2,NaOS_2O_2.$$

It is a white salt, crystallising in magnificent brilliant crystals; it is nearly insoluble in water, undecomposable in the light when in the dry state, but decomposing with extreme facility under the influence of light when it is in contact with water, giving rise to sulphide of silver, according to the reaction (*a*).

The same compounds may be obtained when recently precipitated chloride of silver is shaken up with a solution of hyposulphite of soda.

Thus it happens that when printed proofs are placed in the bath of hypo. many reactions may occur in succession, according to the quantity of silver that comes in contact with the hyposulphite. Besides, experience proves these reactions will be exactly the same, whether it be nitrate or chloride; only they will be more rapid with the first than with the second.

First, a part of the hyposulphite acting upon the salt of silver, forms some hyposulphite, $AgOS_2O_2$; but the latter, encountering an excess of the hypo., immediately forms the double salt, $(AgOS_2O_2)(NaOS_2O_2)_2$, which, very soluble in water, and particularly so in the hyposulphite, is immediately dissolved. Suppose, for example, the proof to have been previously washed in water, and nothing but chloride of silver remaining, the following formula will exhibit the phenomenon that takes place:—

$$(b)\ 3S_2O_2NaO,5HO+AgCl=(S_2O_2NaO)_2S_2O_2 \\ AgO+NaCl+5HO.$$

Once this salt is formed, if some fresh proofs, and consequently fresh quantities of chloride of silver are presented to the solution thus obtained, the salt, $AgOS_2O_2(NaOS_2O_2)_2$ will tend to form the compound $AgOS_2O_2,NaOS_2O_2$, according to the reaction.

$$(c)\ 2(S_2O_2NaO)_2S_2O_2AgO+AgCl=3(S_2O_2NaO) \\ (S_2O_2AgO)+NaCl.$$

But this compound $(S_2O_2NaO)(S_2O_2AgO)$ is insoluble in water; it will, therefore, tend to deposit itself in the state of crystals on the sides of the vessel containing it, if the liquor be left to repose, or in a pulverulent state in the pulp of the paper of the proof; or in the liquor, if, as in ordinary fixing, the liquor is frequently stirred.

From this moment a serious danger is manifest. On the one hand—as was shown when defining this double salt—it is, amid the water, very easily decomposed into sulphide of silver and sulphuric acid, susceptible of engendering a deposit of sulphur; on the other hand, if we put this salt in contact with a fresh quantity of salt of silver, it will form free hyposulphite of silver.

$$(d)\ (S_2O_2NaO)\ (S_2O_2AgO)+AgCl=(S_2O_2AgO)_2+NaCl,$$

and, as we know already, this hyposulphite of silver will immediately tend to decompose, according to the reaction

$$S_2O_2AgO+HO=AgS+SO_3HO.$$

The preceding reactions are clearly established only when to the same quantity of hyposulphite indefinite quantities of chloride of silver are presented, and there exists a limit of saturation in the solubility of the latter which it is important to determine. In fine, the question may be stated in the following terms:—

Whenever fixing by hyposulphite of soda is made in such conditions as that the hyposulphite of silver, or the second double salt $(S_2O_2AgO)(S_2O_2NaO)$, exists for a few moments in contact with the proof, without the power to dissolve in an excess of hyposulphite of soda, the latter will be decomposed in the proof, according to the reaction (*a*), and, consequently, by the formation of sulphuric acid, give rise to the decomposition of one equivalent of hyposulphite of soda—

$$(e)\ SO_3+S_2O_2NaO=SO_3,NaO+SO_2+S.$$

The sulphur thus formed is deposited on the proof side by side with the sulphide of silver; so that not only one part of the silver covering the proof will be sulphurised on removal from this bath, but it will also carry off a second quantity of sulphur, which, little by little, sulphurising the non-attacked silver, will act upon the proof, and cause it to undergo a greater sulphuration.

To examine the circumstances in which these accidents can be produced, is the object of the present inquiry. Some are accidental; others are produced normally, when a bath is employed for fixing too many proofs. We will examine each in succession.

When a proof, on being taken out of the printing-frame, is directly put into the fixing-bath, it should be immediately stirred, and again at short intervals. This precaution becomes of the highest importance if the proof has not been washed in water, and contains nitrate of silver. Reasoning indicates and experience demonstrates that the *soluble* nitrate of silver acts upon the hyposulphite more rapidly than the *insoluble* chloride; otherwise, a very large quantity of hyposulphite of silver would be formed in contact with the proof, and, not meeting with a sufficient quantity of hyposulphite of soda to be dissolved, is precipitated, and afterwards decomposed.

If a large number of proofs are placed in the bath almost in contact with each other, so that the hyposulphite of soda cannot flow between them when it is stirred, the same accident will happen; and in this case, as in the former, the proofs will most probably be spoiled.

An accident of the same nature, but local, occurs when an air-bubble forms on the proof while being fixed. Then the hyposulphite of soda raised by capillary attraction through the substance of the paper corresponding in extent to the size of the bubble, will form there hyposulphite of silver, which, not being dissolved, is immediately decomposed on the spot, and forms those yellow stains which photographers are but too well acquainted with.

(*To be continued.*)

SCIENTIFIC GOSSIP.

We are now enabled to place before our readers some further details respecting the photographic experiments which were made at Woolwich by Messrs. Spiller and Crookes, during the recent eclipse of the sun. The weather was, on the whole, very favourable, considering the gloom which has been prevalent for so long past. In the morning, the sky was almost entirely overcast, but towards 1 P.M. breaks appeared in the clouds, and as the time of the commencement of the eclipse drew near, the light, fleecy character of the clouds gave great hopes of numerous opportunities being found for obtaining photographs of the different phases of the phenomenon. The telescope was of about six feet focus, with an object glass of about four inches diameter. It was erected on a stand in the open air, and was furnished with screw movements both in altitude and azimuth. The eye-piece was removed, and to its tube was affixed a small quarter plate camera. When the image of the sun was received on the ground glass of this camera, and properly adjusted for the best usual focus, it was magnificent in the extreme; the groups of spots with which the sun's face is now plentifully pitted, especially one enormous spot with a well-marked penumbra, were distinctly visible, and, during the progress of the eclipse, the passage of our satellite over these landmarks of the solar face could be almost visibly seen upon the glass as she seemed to crawl along, eating her way into the luminous disc, with her serrated, mountainous edge, looking like the teeth of some fierce monster. For photographic purposes, the full aperture of the object-glass was far too much for the collodion plate. One or two preliminary trials, with exposures not more than the 50th part of a second, certainly showed, on developing, that the sun's image had shone there; but the plates illustrated in a remarkable degree the phenomena of over-exposure. On pouring on the developing solution, at the first moment some suspicion of a solar disc was discernible; but almost before it was well apparent, a thick, black, impenetrable veil seemed to overshadow the whole plate, and it was all gone. Successive experiments were then made, by reducing the aperture of the lens by discs of brown paper and card; but it was not until the aperture was lessened to the 4th part of an inch, and an arrangement contrived by which the exposure could be effected in between the 500th and 1,000th part of a second, that the development became at all manageable. With this aperture and exposure, however, the pictures developed slowly, cleanly, and most beautifully; no longer having a painfully red-hot appearance, or being "dark with excess of light," but having the proper light and shade in all parts, and when a light cloud happened to be in front of the sun, giving the representation of it in a beautiful manner. All these preliminary experiments were, of course, concluded before the eclipse commenced: the whole morning, whenever the sun was pleased to show himself, having been devoted by each operator to a thorough rehearsal of the part that he was to play when the great event took place; Mr. Spiller having undertaken the management of the camera and of the dark slide, whilst Mr. Crookes was to be responsible for the due performance of the exposing arrangement, and had to be particularly careful lest a stray thousandth of a second or so did not creep into the allotted time. Both of these gentlemen worked together in the dark room (rather a misnomer, by the way, as large windows of yellow glass made the room almost as light and as pleasant to work in, as if it had been in uninterrupted daylight), the only rule to be observed there being to get through the operations of coating and sensitising the plates, and subsequent developing and fixing, in as short a time as possible. The apparatus, baths, and solutions, &c., were in most instances in duplicate, so that no delay might possibly arise from any bath being wanted when it was already in use for a previous plate.

Unfortunately, at the exact moment of first contact, the sun was obscured by clouds, but a few minutes after, it emerged with a decided indentation on one side; a plate having been in readiness to seize the first available moment, it was made use of, and a print from it forms number one of the series now before us. The first plate having been successful, others were fired off at the sun in rapid succession; in fact, the two experimentalists were to be seen, during almost the whole continuance of the phenomenon, rushing backwards and forwards across the interval dividing the telescope from the operating room; and so well did they make use of their time, that, on an average, a plate was exposed every five minutes during the whole continuance of the eclipse. The picture taken at 2h. 48m., the exact minute of greatest obscuration, was, fortunately, one of the most successful of the whole series. The sun is seen in it as a beautifully sharp crescent of light, the serrated edge of the moon being in curious contrast to the smooth edge of the sun. The cusps are beautifully sharp, but we look in vain for any continuation of the radiation of light round that portion of the moon's circumference which was not projected in front of the sun; there is no trace of anything which can be construed into an incipient corona, although the slightly less sharp appearance which the moon's edge presents over that of the sun may seem to show indications of the refractive power of a lunar atmosphere. The effect of the gradual diminution of the sun's light upon the landscape was very remarkable. During the first portions of the eclipse, the appearance was not unlike that observable before a thunderstorm, the gleamy appearance of the sun's light being very similar to that noticeable when thick, black clouds are in its neighbourhood, and partly obscuring its face; but as the moon crept over more and more of its surface, the effect became more and more strange, giving place to an unearthly, ghastly, yellow gleam, which was totally unlike any other effect which we remember to have seen, and is due not only to the suppression of four-fifths of the sun's light, but principally to the fact of the small apparent size of the illuminating surface of the sun. Under the foliage of the trees which were in the neighbourhood, the effect was very curious. The spots of sunshine falling through the leaves on to the ground, ordinarily present a circular form, and are, in fact, nothing less than minute images of the sun. As the eclipse wore on, however, these circular patches of light became crescent-shaped, and, between half-past two and three o'clock, the whole ground beneath the trees was apparently studded with mimic representations of the sublime spectacle which was to be seen taking place over head. During this time, also, the temperature of the atmosphere was decidedly lower than it was either before or after the time of greatest obscuration.

The above notes are all that have as yet reached us respecting the attempts which were made to obtain photographic records of the eclipse. Up to the time of our writing these lines, the details of Mr. De la Rue's successful labours at Burgos have not yet come to hand.

PHOTOGRAPHY AND ITS APPLICATIONS.*

ON THE EMPLOYMENT OF PHOTOGRAPHY IN SURVEYING AND MILITARY RECONNOITERING.

BY M. A. LAUSSEDAT.

The collodioned plate being placed in a vertical plane, the optical axis of the objective must be made perpendicular to it. This optical axis meets the sensitive plate at a point, which is the principal point of the perspective; the distance of the optical centre from the plate is exactly the distance of the point of view of the picture: the horizontal plane passing through the optical centre, cuts the picture by the *line of the horizon.* If we suppose the latter to be divided into degrees, by rays starting from the optical centre or point of sight, we shall have a scale of tangents on the photograph, which will immediately give the angles comprised between the vertical planes furnished by the point of view, and by the various remarkable points in the panorama; or, what amounts to the same thing, the angles comprised between the lines of the view, which, on the horizontal plane, proceed from the point of view to the projection of these points. This horizontal line divided into degrees, may be traced on the proof, if the operator has taken care to determine, by means of a theodolite, a certain number of points situated on the horizon; but in the apparatus of M. Laussedat, the sensitive plates themselves receive the imprint of this divided line. Every photographer, therefore, carries with him his horizontal line; and if the instrument has been carefully planted, and if the rotary motion given to the camera, in directing it to various parts of the horizon, be performed round a vertical axis, the lines of the horizon in the proofs successively obtained at a given station, will be found in the prolongation of each when the proofs are placed together.

The construction of a plan, by means of photographic perspectives, presents no sort of difficulty; it suffices to read, on the horizontal line of the proof, the numbers of the degrees comprised between the vertical lines which pass through the various objects in sight, and to trace on the plane, by rule and compass, the lines of the corresponding view. The mutual intersection of the lines of the view, which, from two known stations, pass through the same objects, determine the horizontal projections of these objects. To make this construction, M. Laussedat makes use of a kind of protractor, formed of a sheet of tracing paper, mounted on a frame of card-board; he traces upon it a square, divided like the horizontal lines of the photographs, so that the divisions of this scale of the protractor may be made to coincide with the divisions of the lines of the horizon. The zero of the scale is at a middle point, which in the coincidence corresponds to the principal point of the perspective. If we raise a perpendicular through this middle point, and take on this perpendicular a distance equal to the focal length of the objective of the photographic camera, we shall have the centre of the reporter, or the point from whence the radii, which terminate on the divisions of the scale, set out.

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* Concluded from vol. iv. p. 136.

To obtain the line of view which joins the station to an object, we place the centre of the protractor on the point of the plan where the station is marked, and make the scale of the protractor coincide with the horizon line of the photograph, or rather with a straight line drawn parallel to this horizontal line at the bottom of the photograph, beyond the landscape; this straight line can here be taken for the horizontal line itself, round which we shall have limited the plane of the picture. This done, we project the object on the scale of the protractor, and by joining this projection to the centre of the station, we obtain upon the plan a straight line, or line of view, which, from the station, cuts through the horizontal projection of the object.

The inconvenience of photographic views consists in their embracing only a limited extent of the panorama; as the distortion caused by the objection must be avoided, it is advisable to limit to 25 or 30 degrees the amplitude of the views upon which we must operate to construct the lines of view. This inconvenience does not exist to the same extent in views taken with the camera lucida, as this instrument produces no evident distortion in a horizontal extent of 60 degrees. But, owing to the great rapidity with which we can operate, we can in photographic views easily avoid distortion, by dividing the perspective view into a greater number of segments; only it may happen, when constructing the plan, that the two objects, the lines of which are sought in the design, do not appear on the same photographs. In this case, we select several intermediate points, each belonging to the two contiguous photographs, and arrange the proofs on the protractor at a suitable inclination, which is immediately given by the lines of the view relative to the objects reproduced upon the two neighbouring proofs.

If the camera has been carefully adjusted with a level, the geometrical elements of the levelling are obtained as easily as those of the plan. We measure on the photographic proof the rectilinear distance of the object from the horizontal line, and on the transparent protractor the length of the right angle comprised between the centre and the projection of the object; the elevation of the object above the horizontal plane is equal to its real distance from the point of view, multiplied by the relation of the line measured on the proof, to the length of the right angle taken upon the protractor. This same relation gives the tangent of the angle of inclination, or the angular height of the object above the horizon. We perceive that the levelling is much more exact, the greater the line measured on the proof; therefore, the object must not be too far from the point of sight.

But for plans constructed from photographs to possess all the exactitude of which the method is susceptible, we must be sure that the photographic images have undergone no apparent distortion. To this end M. Laussedat proceeds as follows:—

At the same point from which the photographic view has been taken, a plane-table is placed. Two articulated rods which support the prism of a camera lucida, are adjusted to the sides of the plane-table. The image of the camera lucida can easily be made to coincide with that of the photograph. The superposition thus established for objects situated near the principal point of perspective will also occur for objects that are distant from it; and as the image given by the camera lucida is much larger than the proof, there are some excellent data in the lines which are upon the margin of the latter, and which will be found in the prolongation of the same lines taken on the picture from the camera lucida, if the objective of the camera has produced no distortion. In this position of the prism, the distance from the plane-table is equal to the focal distance of the objective.

We can also discover the distortion of the images given by the objective, by comparing the angle comprised between two images situated upon the margin of the photograph, measured on the divided horizontal line, with the value we shall obtain in taking with the theodolite the angle comprised between the two objects: this latter angle, combined with the interval which separates the images of the two objects on the proof, will also make known the focal distance of the objective. These measurements must be taken once for all, and are special to the instrument we make use of for the reconnoissance to be made.

In conclusion, the application of photography to surveying realises an important progress for photography. The photographic camera, as at present constructed, becomes a true goniometer, if care be taken to plant it suitably, and to add to the photographic views certain geometrical elements easy to be obtained. A few very simple instructions as to the choice of stations, will suffice to put photographers in the way of furnishing a great number of documents from which geographers, geologists, engineers, and architects, may derive very great advantages.

The Photographic Tourist.

A PHOTOGRAPHIC TRIP TO BASSÆ.

BY MAJOR SHAKESPEAR, R.A.

Having lost three days through the vexatious ignorance and stupidity of a junior official of the quarantine department of Greece, we landed from a cutter yacht at the small harbour of Katacolo, 27 miles south-east of the island of Zante. A few days previous, a steamer, in passing Zante, had landed a few passengers; in the course of ten days, one of the crew died of small-pox at Trieste, therefore it was considered necessary to put Zante in quarantine; but we came with a "clean bill of health," direct from the island of Cephalonia in nine hours, therefore either the official would not, or could not read or understand; but the probability is, he wanted to get a little money out of us. This is the style of petty annoyance to which one must get accustomed in Eastern Europe; there is no alternative, so it is best to grin, and try and feel in a good humour.

We started from Katacolo at 7½ A.M., 27th March, 1860, with our baggage and creature comforts on five pack horses, and walked along a sandy road near the sea, skirting an extensive plain, luxuriant with asphodels in full bloom. As we neared the town of Pyrgos, we were astonished with the quantity and neatness of the cultivation; there were gardens of vegetables, vineyards and fig orchards, and working in them were labourers by the dozen, mostly dressed in clean white dresses—splendid looking fellows, and all young. Pyrgos is built on the slope of an elevated piece of ground, rising between Mount Olonos and the river Alpheus; it appears to be an industrious, thriving place. We passed through it at 10 A.M., every person stopping or coming to the house door to look at us, as they do always in an eastern country town. We quickly descend to the Delta of the Alpheus, and crossing it, arrive at the broad, shallow, but rapid river in three-quarters of an hour. After some little trouble, the horses have been unloaded, crossed in the ferry boat, and reloaded, and our march continues through the village of Agolonitza, by the sea; through the reeds and rushes are wild fowl innumerable, but mostly out of gunshot; steep banks studded here and there with pine trees, begin to rise on our left; at 3 P.M. we turn abruptly from the sea to the left, and ascend a well-cultivated glade edged with pine trees for about a mile, when we arrive on a plateau, and march along on lawn turf and moss, under the spreading branches of magnificent pine trees (we measured several 15 feet in circumference 5 feet from the ground); most grateful was the shade, even at this early time of the year. A stag, or boar, starting from the patches of ferns, would have perfected the scene. At 5 P.M. we ascend a steep and hollow track, winding through sandy banks as if made by winter torrents, and enter a village (Kristina) lying on a bright, sunny slope, overlooking a small, bright green (evidently swampy) plain, backed by rough and wildly-shaped mountains.

Kristina is a small but well-built village of stone, roofed with red tiles. A most jovial fellow—the fashionable shoemaker—most hospitably offered his second storey for our use; so, accordingly, after the usual amount of inspection, right, left, front, and rear, from the inhabitants, we entered, and passing under a roof of pendent shoes, ascended a ladder, that in England would only be used by cocks and hens; but our roost turned out to be a fine, large, and lofty room, perfectly clean, well plastered, and whitewashed; but, as is almost invariably the case, there was not glass in the windows, shutters only being in use. Our hostess appeared either not to be pleased on that day, or to possess a chronic bad temper; the latter we believed to be the truth, as the cool indifference with which the jolly cobbler stuck his thumbs in his breeches pockets, vibrated his fingers, rolled his eyes, screwed up his mouth, and whistled whenever she cackled loudest, betokened a serene indifference, which time and habit only could produce.

We heard of deer and wild boar being plentiful in the woods. We left Kristina at 7.20 A.M. next day, and for two hours passed up a glen, which in character might be found anywhere in the west of England. There was the winding trout-stream with its overhanging banks and rustic bridges, the fallen, decayed tree and withered branch, with drooping ivy. We peeped over the stones, looking for fish, disturbing the dragon-fly, as when we were children at home. We walked on a carpet of violets, forget-me-nots, anemones, irises, and all that variety of wild flowers so familiar to our boyhood. At 8.30 A.M. we pass through one of those glades so peculiar to the Morea, where huge, towering rocks and earth so resemble the works of man, that at a little distance it was hard to believe that it was the natural formation. One of the party exclaimed, "The Cyclops cannot be fabulous; that must have been one of their castles." We now commence a steep ascent up the side of a mountain, the numerous springs and mud rendering walking laborious in a hot sun. At 10 A.M. we enter the well-built village of Greca, of about eighteen houses; here is a fountain of excellent spring water; its masonry is, probably, Venetian, but there can be no doubt that the luxuriant and beautiful maiden hair fern about it, bespangled with crystal-like drops, is genuine Greek.

We had given out to our muleteers that we should return by the site of Olimpia, to which they made no objection on the first day; but when they had us entirely depending on them they began, as do their race, to consider their *own benefit* at the expense of their *hirers*. "No," they said, "we won't go by Olimpia," "it's impossible," "the road is too long," "there are no villages," "the rivers are too deep," and such like excuses. Unfortunately for them, they had not a novice to deal with; and perched up in the mountain at Greca, I could examine the country towards the site of Olimpia, and far beyond it. The question of villages was nothing to us, as we would have slept in the open air, but the state of the rivers required attention. However, with the aid of my telescope, I soon decided. "The rivers can be passed, though it may be a job of difficulty, requiring care. To Olimpia you shall go." We descend rapidly, cross a torrent, and recommence our ascent through a forest of arbutus, ilex, and oak, hung with clematis. This track is quite new, the stumps were left a foot above ground, and the leaf was still on the fallen trees; our pack horses showed signs of distress, and blundered about; bang, smash against a tree goes part of the baggage, and away goes the box of chemicals through the trees, down the mountain side. Well, my wish for 17 years to get to Bassæ may be accomplished, but the prospect of photographic views is now at an end, and in all confidence I had left my sketch-books behind. Taking the troubles of the world philosophically as I usually do, I walked on, but the mountain felt steeper, the day hotter, and my shoes began to pinch. At 11.30 A.M. we are on the top of the ridge, and leaving the village of Platiana to the left, in a quarter of an hour we commence a very steep and rugged descent into a long, broad, stony, and barren-looking valley; how the mules and horses manage it, is wonderful.

The village of Platiana is on the north side; and, by crossing over and descending, as we did, on the south side of the mountain, we pass near and below some fine Hellenic ruins of the third order, also called by the peasants Platiana—Colonel Leake seems, however, to consider them to be the ruins of Typaneæ—we soon arrive at the small, dirty khan (Strubes). Until 3.30 P.M. we keep gradually ascending the long valley, crossing streams innumerable, which have their rise immediately from the mountain sides, amidst groves of ancient plane-trees. We are told, "*beyond* that solitary house on the ridge is Andritzina." True enough, it is beyond, but it is four long hours' march, over uninteresting, rugged hill and dale *beyond*, and we do not arrive there until 7.30 P.M. Wearied with twelve hours' hot and toilsome march, we get dinner cooked as quick as we can, which is in two hours, and go to bed. We have had a family ejected, and have installed ourselves as the rightful occupants, but with our own furniture.

I am awake at 4 A.M., for the state of the erratic box of chemicals troubles me. I get up and examine it, when, lo! and behold, all's well. I adjust the magic mixture for the coming day, and sleep again. At 8 A.M., 29th March, we leave Andritzina, mounted on pack saddle-horses, and recommence the journey the object of which is so near. I have not gone a quarter of a mile, before I am in such a position of road, that a plumb-line let fall from my own nose would fall a foot beyond my horse's nose. "By Jove! I can't stand this gymnastic exercise of clinging on," I say; "I'll walk," and off I get; but shortly we begin to climb, and I mount again, and climb, climb. We go over wild and desolate rocks, a sprinkling of stag-headed, ancient oaks adding grandeur to the wild scene. We cross many streams on the way, and at last the guide says, "This is the last water to be found on the mountain." It is a clear and copious spring, and I fill my cask for photographic purposes.

The patches of snow that we had looked at on three preceding days now became a reality. We ascend for twenty minutes more, and still the same grey rocks surround us. "Where's the Temple?" we begin to say; but we creep on, when, lo! the *curtain falls* (as I am ascending, I can well use this expression), and, at 150 yards distance only, there stands the Temple of Apollo, in all its stern and solitary grandeur.

(*To be continued.*)

THE SOLAR ECLIPSE.

A communication, subsequent to the telegrams we published last week, has reached us from one of the photographers who accompanied the Astronomer Royal to Spain. It appears that the morning of the 18th was louring and unpropitious in the extreme, and there was every reason to fear that the labour and expense of the expedition would be thrown away. However, just before the eclipse began, the clouds dispersed, and our friends' faces were gladdened by the sight of a clear sky. No fewer than forty-four photographic negatives were taken in little more than two hours, and all the anxieties of the day were compensated for by complete success. We hope to be able to publish full particulars of this important expedition next week.

ON THE PRESENT STATE OF OUR KNOWLEDGE REGARDING THE PHOTOGRAPHIC IMAGE.*

IN the photographic processes in which the chloride of silver is employed, it is to be borne in mind that the chloride of silver is not used by itself—nay, by itself, is quite inadequate to the production of the deep colour requisite for photographic effects. It is used, in fact, always in conjunction with nitrate of silver, and also, it must be added, with organic substances, among which the cellulose of the paper and the glue-like size are prominent. The action of the nitrate of silver needs little explanation; it supplies continually a fresh surface of chloride of silver, formed by part of the chlorine given off from the surface of the original chloride, which unites at once with the silver of the nitrates, and simultaneously becomes blackened by the action of the light. It is singular, however, that it has escaped the observation of the chemists who have experimented on this point, that an oxide of chlorine is also formed at the same time, as may be shown by the renewed deposit of chloride of silver which is produced in the supernatant nitrate by the addition to it of sulphurous acid. That the darker compound produced by the presence of nitrate of silver is in no respect different, save that it is a more abundant deposit from that formed from the chloride alone, is evidenced by the identity of its reactions with those of the latter. For here, again, dilute nitric acid of sufficient strength to dissolve silver at 112°, is inert in its action on this bluish-black compound. Chlorhydric acid, if not sufficiently dilute, renders it somewhat paler, and gives a brownish hue to its slaty violet, but otherwise does not alter it. Hyposulphite of soda dissolves nearly the whole, if sufficiently strong, leaving but a trace of metallic silver; and ammonia acts in a similar manner, while cyanide of potassium appears entirely to dissolve it.

In order to be satisfied that the bluish slate-coloured substance formed in the presence of nitrate of silver by the action of light on the chloride was not an oxychloride, an attempt was made to form such an oxychloride by operating on the chocolate-coloured substance so often alluded to. Boiled with caustic potash, this became dark brown; but nitric acid restored to it its chocolate tint. The substance operated on in this experiment was formed from the citrate by the action of hydrogen (in this case in the presence of nitrate of silver), and treatment of the products as before, by chlorhydric and nitric acids in succession.

We consider that we are justified in drawing the following conclusions:—

1. That the action of the light on chloride of silver is to reduce it, in so far as it is able to penetrate its substance, to the state of a subchloride.

2. That, in the presence of nitrate of silver, this deposit of subchloride is necessarily more plentiful, while some part of the liberated chlorine passes into an oxide, which prevents a portion of the chlorine set free from conducing to the formation of fresh subchloride.

From this point we may proceed to the discussion of the photographic image in more complex, but, for the photographist, more available forms. And, in doing so, we must at the outset bear in mind that the image varies in its character in different stages of the photographic process. The first result obtained by the light, even if it be the same in all stages of the solarisation, is not the result which is in many cases left after the fixing solution has performed its work; but it is, perhaps, more interesting, as indicating the nature of the change effected by the light, independent of the chemical re-agents which are afterwards applied.

In endeavouring to reduce into orderly arrangement the great number of photographic results which this inquiry involves, it seemed best to sever at the outset two series of them which bear but little relation to each other—namely, the images obtained by development, and those which are formed visibly by the light. Commencing with the latter of these, the attention is at once arrested by the processes involving the use of chloride of silver in conjunction with the nitrate of that metal.

The *rationale* of the union of these two compounds for the production of an effect far greater than that upon the chloride alone, has been shown; but, practically, in photographic processes there are other agents present in the paper, or purposely introduced into it, which play a part in the photochemical change hardly less important than that of the silver salts themselves.

We may fairly inquire, in the first instance, whether the presence of the fibre of the paper itself may not assist in effecting decomposition under the influence of light. To determine this point, Swedish filtering-paper, as the type of the most uniform and pure fibre of paper that could be procured, was treated with nitrate of silver alone; on being exposed for some hours, it exhibited a pale-reddish stain, which, after several days' isolation, reached no deeper tone than a brown. The substitution of ammonio-nitrate of silver for the nitrate, gave a rapidity to the change, and ultimately a depth of opacity to the result, by affording an antagonism, as we suppose, to the influence of the nitric acid. The reactions of the darkened ammonio-nitrate paper are as follow:—Ammonia does not otherwise affect it than that treatment therewith (probably by action on the tissue of the paper) makes it slightly more readily acted on by other re-agents. Nitric acid, though exceedingly dilute, rapidly dissolves it. Indeed, an acid so far diluted that it took many hours to destroy the substance left by treating with ammonia Swedish paper that had been prepared with chloride of silver and subsequently darkened in the sun, was able to destroy this bronzed image formed by the ammonio-nitrate in a few minutes. Cyanide of potassium in presence of air rapidly destroys it, but not so rapidly as it does the image on chloride of silver just alluded to.

It would be difficult, from the above reactions, to come to any positive opinion on the nature of the photochemically-changed substance left by the ammonio-nitrate of silver on pure tissue of paper. But that this tissue is not without a part to play in the changes which the oxide of silver undergoes—perhaps even a more important one than that of an absorber of oxygen—seems indicated by one curious experiment. Swedish filtering-paper treated with nitrate of silver, and, while still moist, touched with a solution of protosulphate of iron, gives a grey stain easily recognised as metallic silver. When, however, it is suffered to dry (of course in the dark), the stain thus formed, instead of a grey, exhibits a dense black tone, which immediately afterwards passes on into a brown. The former of these is probably suboxide.

But if the tissue of the paper is not to be altogether excluded from the list of possible co-operative agents present in these processes, there are other substances of which the influence can be demonstrated in a manner quite satisfactory to the photographist. Gelatine as size was long employed without his being conscious of its importance; and he now uses albumen as a photographic glaze, and sometimes other substances, such as grape sugar, Iceland moss, caseine, &c., on account of the fine tones and permanence in the fixing-bath which they impart to his pictures. Gelatine and albumen both combine with nitrate of silver; and the character of the combination is one which chemistry has yet to explain with completeness. These compounds differ from each other in many important respects; we shall select that with gelatine for illustration. The characters of the compound of gelatine and nitrate of silver are exhibited by the following statements:—

If a sheet of transparent gelatine be floated upon a solution of nitrate of silver, the solution loses a considerable amount of the dissolved salt. When the proportion of the gelatine to the bulk and strength of the solution is sufficient, free nitrate of silver is scarcely to be detected in the bath, and what silver is found there is probably in the form of a gelatine compound, which is not entirely insoluble. The gelatine mass, though but slightly soluble in cold, is so to a considerable amount in hot water, and retains at once the neutrality and the taste of the nitrate. The solution gives the following reactions:—

Caustic potash throws down a bulky olive-brown precipitate, which clots into a tough extensile mass. This dissolves by boiling with excess of the precipitant, yielding a very dark, and, when diluted, a clear yellowish-brown solution.

Strong ammonia produces no precipitate, but on boiling forms a pale orange-yellow solution, on which the light produces little or no change.

Chloride of ammonium, introduced cautiously, produces no precipitate, but in excess renders the solution turbid. The clear liquid is not rendered turbid by boiling; but a few drops of nitric acid, if the temperature be raised to the boiling point, suffice to render it milky from separation of chloride of silver, which may be re-dissolved by ammonia, or darkened by the light.

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* Continued from vol. iv. p. 140.

Iodide of potassium, unless carefully introduced, throws down a turbidity of a yellow tint in it. But if this be removed by filtration, it will be found that the addition of the most dilute nitric acid and boiling throws down a fresh amount of iodide of silver.

Cold nitric acid produces no change in the gelatino-nitrate (?) of silver, even when formed from the ordinary commercial gelatine; but boiling throws down sometimes a small quantity of chloride, originating in the impurity of that body.

Chlorhydric acid in minute quantity produces also no precipitate until boiled, when the chloride of silver separates from the compound.

The gelatinous mass, formed by the action of the nitrate of silver solution upon the gelatine, becomes, on exposure to the sunlight, of a red colour. The change is a rapid one, and is accompanied by a shrinking of the mass to its original character of a thin sheet as it dries. The colour attained by prolonged solar influence is by transmitted light a deep ruby, and a "bronzed" green by reflected light. Sheets of the gelatino-nitrate of silver thus solarised no longer swell up or dissolve in boiling water, but only after long boiling become disintegrated in filmy fragments. Potash gives, on boiling, a clear solution, which, even when dilute, is brownish-red, and appears opaque when concentrated. Ammonia added to this liquid diminishes its opacity, and gives it an orange hue.

In inquiring what the character of the change effected in these bodies is, we would direct attention to a process analogous to that by which the citrate of silver was examined. If hydrogen be freely passed over the albuminate of silver in a water-bath, this becomes converted into a red body resembling in all essential particulars the red substance into which the light converts the same albuminate. In each case the reaction with the different tests is the same. That, in fact, a suboxide is in each case formed, and that this suboxide is in combination with the albuminous or gelatinous substance, seems the natural conclusion from what has preceded, no less than from the reactions of the bodies themselves.

The silver cannot be there in the metallic form; else, why should potash dissolve it, and why should ammonia convert it into a paler body? Moreover, metallic mercury does not amalgamate with it. One reaction, indeed, might be urged as militating against this view. The hyposulphite of soda has but little action on the red compound, whereas it dissevers the constituent elements of suboxide of silver as dissolved oxide of silver and residuary metal. But we have shown that silver is not entirely precipitated from its gelatinous nor from its albuminous compound by such tests as chlorides or iodides, and one will hardly, therefore, see with wonder that the albuminate or gelatinate of the suboxide resists the action of the alkaline hyposulphite. Nor would it be out of place here to hint, as our colleague Mr. Hardwich has done, at the high probability of the suboxide of silver associating itself with organic substances, such as cellulose, albumen, gelatine, &c., in a manner analogous to that in which other metallic salts, in which the metallic element is not entirely saturated by metalloid elements, act the part of conjugate bodies, annexing themselves to the organic substances alluded to, and to colouring matters of various kinds. The action of these mordants belongs still to an obscure chapter of chemistry, but it is highly probable that the compounds under consideration are closely allied to them.

Finally, we have to bear in mind that the fixing agent modifies the image formed by the light in the materials we have been considering.

The alkaline hyposulphite, like ammonia, acts on the subchloride or the suboxide of silver, splitting the one into metallic silver and chloride, which becomes dissolved, and the other into oxide and metal.

Obviously the conversion of an image formed of either of the intensely colorific sub-compounds of silver into a pale metallic deposit containing only half the amount of metal, and possessing none of the remarkable colorific energy of the suboxide or subchloride, is a conversion that can only be expected to exhibit a great loss of tone. Practically, the singular immunity from this dissevering action which the organic matter, combined with or conjugated to the sub-compound of silver, extends to that sub-compound, comes in to help the photographist from losing the beautiful result which the light itself produces. And what little he still must lose he can almost restore again by the remarkable toning methods which he has recourse to.

The rationale of these toning methods is to be sought in the chemistry of each different process. The deposit of gold from a solution of that metal is, in its broad features, a simple reaction—a deposit of a more electro-positive metal in substitution of one less so—but the precise details of each method of using a gold toning-bath doubtless involves more refined chemical explanations. Without attempting to go into these, we would invite attention, however, to the sulphuretting baths by which this toning is sometimes conferred on the pictures. Sulphide of ammonium converts the fixed image on paper into, first, an intensely black compound, and, subsequently, by its continued action, into a dull yellowish, scarcely visible stain. The latter, there can be little doubt, is sulphide of silver. It seems highly probable that the intermediate step in the process is the production of a subsulphide, and that it is at that stage that the progress of sulphurising is arrested in a successfully-toned picture. This explanation would be quite in harmony with the conditions under which the toning is performed.

The results, then, at which we conceive that photographic chemistry may be said to have now arrived, in respect to the direct processes involving the use of silver-salts, may be thus stated.

The materials employed perform various functions:—

1st. One of these is that of supporting the picture, as a mechanical material or basis for holding the chemical bodies. Of the substances so employed the tissue of paper is one. Pyroxyline (the product of a substitution effected in the elements of the cellulose) is spread on glass to afford another. The latter appears to be inert. The former, on the other hand, seems to aid in the reduction, and possibly in some cases to remain in union with the reduced result.

2ndly. The silver-salts employed, whereof the chloride—for which may be substituted other salts, as the tribasic phosphate, the tartrate, the citrate, and many others, though each with a specific effect—appears to act by imparting *sensitiveness.* The nitrate, on the other hand, is present in excess to keep up a constant succession of sensitive material, and so to give *vigour* and *intensity* to the image.

3rdly. Gelatine as a size, or albumen as a glaze, and various other substitutes for these (though but little linked together by any chemical analogy amongst themselves), co-operate by conferring *rich tints* and deep tones, while they at once impart to the image formed on them an immunity from the destroying action of the fixing process, and form a mechanical surface more or less impenetrable, which prevents the other sensitive compounds from sinking into the paper.

Each of these substances can, provided nitrate of silver be present, be employed to produce an image. Thus, the chloride rapidly produces a faint picture; the "gelatino-nitrate" slowly yields an intense one; together they produce the required result. Whether that result is a cumulative one, the sum of the separate results, or a conjoint one produced by a combination of the chloride with the gelatine compound, it were difficult to say.

The image is, however, a mixed one, for treatment of it with dilute nitric acid leaves the slaty violet subchloride of silver. It seems therefore to be a mixture of subchloride with a gelatinous, and perhaps also a cellulose-compound of suboxide of silver.

(*To be continued.*)

Critical Notices.

Practical Hints on Photography; its Chemistry and its Manipulations. By J. B. Hockin. 12mo, pp. 168.*

A practical manual of photography has been a desideratum for some time past, therefore a new and complete edition of "hints" from the pen of one so well versed in the theory an practice of our art as Mr. Hockin is, will be welcomed by every photographer. The tyro may be at once initiated by it into the present eclectic practice of the art; while the adept may derive some useful hints, and become confirmed and assured in that which yields the best results.

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* London: Hockin and Co

The continuous and steady progress of photography to greater simplicity in its operations, and certainty in its results, is mainly due to the labours of those who, to profound chemical knowledge, have added long practical experience. That which in the early days of the art was vague, doubtful, and uncertain, has become cleared up, and the path now opened to the beginner is tolerably smooth and easy, and promises to become still more so. When the art has reached its maximum of simplicity and certainty—a consummation, apparently, not far distant—a photographic apparatus will form as necessary an appendage to the cultivated as a writing-desk, and one not more bulky.

The chief merit of this book is its eminently practical character, and entire freedom from pedantry. On certain points the author is at issue with other learned pundits of the "black art;" but we think his dictum is as reliable, and to the full as worthy of consideration as any other.

The first section treats of *apparatus;* lenses, cameras, tripods, tents, baths, &c.; next follows *chemicals.* The author's views on the manufacture of collodion are at variance with those lately promulgated; but his strength and wisdom are shown in his bias for simplicity. The recent discussion on collodion has raised the idea that that important agent in photography had become as difficult of attainment as the philosopher's stone; and we are really grateful to Mr. Hockin for having restored our confidence in the old processes by which good collodion has been, and still may be, obtained. For *iodising,* he recommends two iodides; and gives the preference to those of ammonium and cadmium for negative collodion. When treating of the *nitrate bath,* he protests against the addition to it of acetic acid, and of carbonate of soda and oxide of silver to correct acidity of the solution, and also against the use of fused nitrate of silver. On some of these points, and in his recommendation of ammonia to neutralise acidity, he is at variance with most photographers; but with many of his views we fully coincide. The directions for the proper mode of employing *test-paper* are valuable to the non-chemical photographer. *Developing* and *fixing agents* follow next in order. With regard to the dangers attendant upon the employment of cyanide of potassium, we must confess that we think he has treated that dangerous poison too lightly. If his remarks were addressed only to skilled chemists, the case would be different; but this book will, doubtless, fall into the hands of many who are uninitiated in toxicology, and who cannot appreciate the dangers attendant upon the incautious handling of such a deadly agent as cyanide of potassium. The number of deaths annually resulting from this salt, whether accidental or intentional, is sufficiently formidable to warrant us in excluding it from the operating rooms of all photographers who have not taken their degrees in chemical science.

In the *chapter of accidents*—from which death by cyanide is omitted—the author enters into an explanation of the causes of failure, which is very satisfactory. The obscure subject of fogging also is cleared up; while the sources of *stains, marblings, spots,* and "*comets,*" are examined, and these plagues of photography summarily disposed of. While treating of collodion, the claims of the late Mr. F. Scott Archer, as the inventor of the collodion process, are duly recognised; but with respect to his being also the originator of the use of pyrogallic acid as a developing agent, we may remark that a counter claim has long ago been set up by the eminent French chemist, M. Regnault.

The *dry processes* are next fully detailed—preference being given to Fothergill's; then follow the *paper processes;* an account of the invention of *photogalvanography;* useful chapters on *saving residues,* on *microphotography,* on *chemical manipulation,* and *a chapter on optics,* by C. P. Symonds, Esq. It is a conclusive proof of the eminently practical character of this book, that all these subjects are sufficiently detailed without leading to the production of a bulky volume. Altogether, this is as complete a work on the subject of photography as any extant, and as a manual for the beginner may be cordially recommended.

A Catechism of Chemistry.

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LIGHT.—(*continued.*)

Q. What takes place when a ray of light falls upon any body?

A. It may be either *reflected,* or *transmitted* and *refracted,* or it may be *absorbed.*

Q. What is the reflection of light?

A. If a ray of light fall obliquely upon a flat polished surface, the greater part will be thrown off obliquely in the opposite direction to the incident ray of light, but at the same angle.

Q. Do bodies vary in their power of reflecting light?

A. They do, to a very great extent. In some, the reflection is almost perfect, whilst in others this property is almost entirely wanting.

Q. What bodies possess the power of reflection to a great extent?

A. The metals are preeminently distinguished by their great reflective properties.

Q. What bodies are those which do not reflect much light?

A. Black velvet is one of the most common instances of a body in which the power of reflection is almost absent. Charcoal is very similar in this respect.

Q. What is the cause of white paper being so much more visible than a metal, if the latter has greater reflecting properties?

A. A polished surface of metal only reflects an incident ray of light in one direction, whilst a ray falling on white paper is irregularly scattered in all directions, and therefore shines as if it were self-luminous. It is thus equally visible in any position, whilst the polished surface of metal would appear almost invisible to an observer situated anywhere but in the course of the reflected rays.

Q. Is this, then, the cause of the difference between sunshine and diffused daylight?

A. It is. In the former case there are strong lights and shades, and contrasts which fatigue the eye, whilst, with a partially clouded sky, objects are illuminated by a mild and softened light.

Q. What is meant by a ray being transmitted and refracted?

A. In this case the ray of light passes through the object (which is called *transparent*), and during its passage is bent out of its original direction. A study of the laws of refraction are almost necessary to the photographer, but belong more especially to the science of optics than to chemistry.

Q. When a ray of light is neither reflected nor transmitted, it is absorbed. What is the meaning of this term?

A. Light is said to be absorbed when it falls upon a dark, opaque substance, like black velvet, and is apparently lost. When the chemical rays of light fall upon a sheet of orange-coloured glass, they are also said to be absorbed, being neither transmitted nor reflected.

Q. Does the refraction of light follow any particular laws?

A. There are several important laws connected with the refraction of light. One of these is, that an oblique ray of light passing from one medium into another denser medium, such, for instance, as when passing from air into glass or water, is always bent towards the denser medium. This may be easily seen, by placing a straight stick obliquely in a vessel of water; it will appear as if it were broken at the place where the water and air meet, the part in the water being apparently bent downwards.

Q. Does the same substance always bend the light to the same extent?

A. The extent of the refraction, or bending out of the straight line, varies with the angle of incidence; the more obliquely the light falls upon the surface of the refracting body the more it is bent out of its original direction.

Q. Is there any definite proportion which the directions of the incident and refracted rays bear to each other?

A. There is. It may be expressed as follows:—When a ray of light passes from one medium into another, the *sines* of the angles of refraction and of incidence always bear the same proportion to each other, whatever be the angle of the incident ray.

Q. What is meant by the term *index of refraction?*

A. The index of refraction of a body is the number which is obtained by dividing the sine of the angle of incidence in *vacuo* by the sine of the angle of refraction. This number is always constant for the same body.

Q. Is a knowledge of the indices of refraction of different substances applied to any practical use?

A. It is. The purity of many essential oils, as well as the adaptability of different varieties of glass to optical purposes, are discovered by this means.

Q. If the direction of a ray of light is altered when it passes from a rare into a dense medium, how is it that objects seen through flat pieces of glass do not appear altered in position or form by this bending of the light?

A. The reason of this is, that although the ray of light is bent in one direction upon passing from the air into the glass, it is bent to exactly the same extent, and in the opposite direction, when it emerges from the glass into the air. In this way the direction of the ray is apparently unchanged. If the two surfaces of the glass were not parallel, the emergent ray would not follow the original direction, but would become permanently deflected. This effect takes place in the case of prisms and lenses.

Q. When a ray of light passes through a prism, how is it that the emergent beam of light appears coloured?

A. It is in consequence of the different coloured rays which compose white light not being refracted to the same extent. The red rays being least refrangible, are least bent out of their original direction; the yellow rays being more refrangible than the red, are bent more than the latter, and the blue and violet being most refrangible, are thrown furthest from the original direction of the ray. A cylindrical beam of light can in this manner be dissected into its component parts, and stretched out into a coloured line.

Q. Besides the coloured rays, are there other constituents of a beam of solar radiation?

A. Yes; at the red end of the spectrum, but still less bent out of their original direction, are found the heat rays, and at the other extremity, amongst and far beyond the indigo and violet, are found the chemical rays of light, upon which chiefly depend the photographic art.

Q. Is photographic action entirely dependent upon these ultra violet rays?

A. By no means. It is more than probable that every ray of the spectrum exerts a well-marked chemical action upon some substance. The chemical compounds at present in common use amongst photographers happen, however, to be peculiarly sensitive to the extreme blue end of the spectrum, and thus these rays have been considered more especially the photographic rays.

HEAT.

Q. What are the usual sources of heat?

A. The most obvious source of heat to our globe is the sun. Besides this, there are several others, such as friction, percussion, chemical action, electricity, &c.

Q. What is the cause of the heat developed by friction?

A. It is now considered that the actual quantity of heat developed by friction is dependent simply upon the amount of force expended, without regard to the nature of the substances rubbed together. The heat developed on the axles of wheels is due to friction.

Q. In what does percussion differ from friction as a means of developing heat?

A. Percussion combines the effect of friction with compression, and is a much more energetic method of producing heat than friction. The ignition of detached portions of steel by percussion against a flint, as in the common steel and flint, for producing a spark, is an effect which friction alone would not produce. Percussion combined for some time, as in the case of hammering a cold nail upon an anvil, will ultimately make it red hot from the heat extricated by the compression of the particles of iron.

(*To be continued.*)

AN Exhibition of works of art—paintings, statues, drawings, &c.—will be opened at Brussels, on the 15th of August next, and close on the 15th of October.

AT Amsterdam, a Fine Art Exhibition will be opened on the 3rd of September next.

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, *22nd July*, 1860.

THE description of new salts of silver must be of peculiar interest to the photographer; I therefore call your attention to some compounds lately obtained by M. Rautenberg. Among others, this chemist has produced *molybdate of suboxide of silver*, $Ag_2O,2MoO_3$, by passing a current of hydrogen gas into an ammoniacal solution of molybdate of silver. The latter salt undergoes a reduction without the aid of heat, and even when hydrogen is passed over the dry salt. But it is best to heat the liquid to about 90° (centigrade). The suboxide salt is then deposited as a crystalline black powder, brilliant, heavy, in which small octohedric crystals of the first system (cubic) are recognised.

Nitric acid dissolves this salt, whilst potash takes from it the molybdic acid, leaving the black suboxide Ag_2O as residue.

The same process furnishes *tungstate of suboxide of silver*, the composition of which corresponds with the above. It is also precipitated by the hydrogen current as a dark crystalline powder, very brilliant, and showing under the microscope crystals of a rhombic form. Nitric acid dissolves the base, leaving the tungstic acid; potash dissolves the tungstic acid and leaves the suboxide.

Chromate of suboxide of silver is produced in the same manner, but invariably contains metallic silver among its crystals; and is reduced to silver at a heat below + 122° F.

The same author has examined several other salts of silver with a view of reducing them by hydrogen, but without any remarkable results. *Oxalate of silver* is completely reduced immediately; *chloride of silver* is not attacked at all. *Arseniate* and *phosphate* of silver give a brown deposit when mixed with sulphate of protoxide of iron; arseniate of silver dissolved in ammonia is coloured brown by a current of hydrogen, and, after some time, gives a slight black deposit.

According to M. Traun, the brown powder produced when green vitriol is mixed with arseniate or phosphate (yellow) of silver, consists in a mixture of suboxide of silver and metallic silver.

M. Geuther has observed that when hydrate of protoxide of copper is mixed with *nitrate of silver*, the former turns black, probably by formation of suboxide of silver. When a very little hydrated cuprous oxide is added to a diluted solution of silver, and the liquid heated, the protoxide of copper is seen to disappear, and metallic silver is deposited in crystalline laminæ. The same author says also, that *chloride of silver* is reduced to the metallic state when it is boiled with a slightly alkaline solution of sulphite of soda, to which has been added a little chloride of ammonium.

One of our evening papers publishes the following:—

"M. Auguste Bertsch has just obtained a photographic proof, measuring 78 centimètres by 52, from a negative having only 6 centimètres by 4.

"He was not limited to this degree of amplification by any loss of distinctness in the image, or from fear of chromatic aberration, but only by the size of the glass on which he operated, and the room he had at his disposal.

"Experiment has taught him that, when the proofs are illuminated by his method, the magnifying power has no limits save that which is determined by the appearance of the molecular structure of the negative film; which, however, does not happen until the amplification has reached 2,500 times the surface for collodion, or 6,400 for albumen.

"Not only is a quarter of a second sufficient for obtaining these magnified proofs, but it is indispensable that the exposure should not exceed that time, on account of the apparent motion of the sun.

"To produce these results, M. Bertsch has constructed two apparatus. The first is the heliographic microscope, which he has used for reproducing microscopic images by photography, only he has increased its dimensions to render it more apt for these new applications. The other is a small dark camera, with a short focus; its dimensions being only 10 square centimètres, it is easily carried in the pocket, and is well adapted for taking any landscape, figures, &c., which can be afterwards magnified at home."

M. Chichkoff, Professor of Chemistry in the Military School of St. Petersburg, has made a remarkable discovery relating to the molecular constitution of fulminic acid. It results from the author's own experiments, and from those of your English *savant*, Dr. Gladstone, that fulminic acid may be considered as derived directly from common ethylic alcohol, by the substitution of cyanogen for oxygen, and two equivalents of nitrous vapour for two equivalents of hydrogen, thus:—

$$\underset{\text{Alcohol.}}{C_4H_6O_2} \qquad \underset{\text{Fulminic acid.}}{C_4H_4 2(AzO_4)Cy_2}$$

Professor Rammelsberg has lately obtained a new salt—*nitrate of protoxide of mercury and ammonia*—by evaporating together solutions of nitrate of protoxide of mercury and nitrate of ammonia. The salt crystallises in straight rhomboidal prisms; its composition is represented by

$$Hy_2O, AzO_5 + 2(AzH_4O, AzO_5) + 5HO.$$

We know nothing of its properties.

M. Schiff has made rather an important discovery. This well-known German chemist has observed that *nitro-benzine* (one of the substances which furnish aniline) is produced by the action of nitric acid upon essence of turpentine. It is well known that when concentrated nitric acid acts upon this essence (and the experiment is rather dangerous, as the mixture is apt to take fire spontaneously) a resinous substance and an orange-coloured liquid are produced. When these products are evaporated quietly together, mixed with quartzeous sand, and submitted to dry distillation, they produce an acid liquor and a brown oil, which, according to M. Schiff, contain nitro-benzine.

It is of the greatest importance, in many chemical manufactories, porcelain works, &c., to be able to determine, with the greatest possible precision, the temperature of furnaces heated to very high degrees. To this effect were invented the pyrometers of Wedgwood and of M. Brongniart. But M. Jourdes has just invented an apparatus which can be relied upon for measuring a given degree of heat, without determining the exact number of thermometric degrees which correspond to it, and which appears preferable in every respect to the two pyrometers above-named. It consists of a bar of iron which projects into the middle of the furnace, and at the exterior extremity of which is a cavity filled with oil. A thermometer dips into the oil, and the latter, being heated by the conductibility of the iron bar, permits the operator to ascertain when the furnace is heated to the desirable point, as the thermometer in the oil always indicates the degree to which the interior of the furnace is heated.

The following is extracted from a letter addressed to M. Elie de Beaumont by M. Prost, of Nice:—

"According to my journal of observations, the ground of Nice has undergone very intense and prolonged trepidations from the 3rd of June to the 12th. The crystals of my chandeliers were almost constantly in motion during that interval; and I saw yesterday, by a morning paper, that these phenomena coincide with the recent shocks of earthquake felt at Broussa at the same period."

M. Pjetursson also writes to the Academy upon a new eruption of the volcano Myrdalsjökull, in Iceland. This volcano, which has often caused considerable devastation in the island, began, on the 9th of May last, to throw up masses of snow, torrents of water, and afterwards ejected flames and burning sand, which were seen at great distances, even as far as Reykjavick. This eruption, which was accompanied with shocks of earthquake, has now ceased, and does not appear to have caused so much harm to the inhabitants as some of the former eruptions. This is owing probably to the fact, that the north wind which was blowing at the time, carried the boiling water and red-hot sand towards the sea. In 1755, on the contrary, an eruption of this volcano lasted three weeks, and spread over the neighbouring regions such a quantity of burning sand that 50 farms were destroyed, men and beasts perishing together. In that fatal year, Iceland lost 40,000 horses, 600 cows, and 4,500 sheep!

The eruption of the 9th of May, 1860, constitutes the twelfth eruption of the volcano in question; the tradition of its activity going as far back as the year 894 of the Christian era.

THE ALBUMEN PROCESS.

**To the Editor of the "Photographic News."*

Sir,—I have re-perused, with much interest, Mr. James Archer's paper on this process in your number of June 1, and, as the wish of its author was "to raise a discussion" upon it, I trust I may be excused for venturing a few remarks on the subject, as no one else has done so.

Mr. Coale's modification was an improvement on Whipple's process, and, on the whole, I think Mr. Archer has improved on Mr. Coale's. He does not saturate his aceto-nitrate bath with iodide of silver, as recommended by Mr. Coale, nor does he add so much sugar-syrup to the albumen, while his proportions of iodide and bromide in the albumen are better. His manipulation seems to me to be an improvement on both methods. Compared with the old albumen process (the best description of which is by Mr. Negretti, in vol. ii. p. 128 of the "Photographic Journal," and which is evidently susceptible of improvement), Mr. Archer's method appears to be a great stride in the right direction. The question is, can it be advanced still nearer to perfection?

After taking the plate from the sensitising bath, I should immerse it in a vertical bath of water, and let it remain there half-a-minute; then remove it to a flat dish containing a solution of acetate of soda and water, or of chloride of ammonium and water; keep it there one minute, and finally give it a thorough washing under a tap. By this course, a longer keeping of the plates is insured, and their sensitiveness probably increased.

The development with gallic acid and acetate of lead was tried by me two years ago (when it first came out), on Fothergill plates, but I gave it up, as I found it not so controllable as the other developers, the slightest excess of acetate of lead damaging the pictures. Perhaps I was too impatient, and did not give it a sufficient trial; but although it may answer well, I question whether it is better than sulphate of iron. Mr. Delamotte (no mean authority), when speaking of the old albumen process, says, "The image is developed more rapidly in a bath of saturated solution of protosulphate of iron, containing one-sixteenth of glacial acetic acid. The time in the camera may thus be diminished three-fourths." This is a most important consideration. If, instead of a 10 minutes' exposure for 9 by 7 plates, Mr. Archer, by employing an iron developer, can reduce the time to 2½ minutes, he will be enabled to introduce figures into his landscapes and views, which is always desirable where it can be effected. Many persons can sit still without moving for three minutes, who could not do so for five, as all photographers know. By the old albumen process, a stereoscopic negative required five minutes' exposure, in a good light, in England, and from three to four minutes in France and Italy, but then the developer was a saturated solution of gallic acid, warmed to 80° Fahr. By adopting the iron developer, and the suggestions here offered, I think stereo. views might be obtained by this process with one minute's exposure.

Although I generally work with wet collodion myself, and have only recently returned from a photographic tour with a tent, I must say that any method which dispenses with wet collodion ought to be looked upon with favour and encouragement by photographers who value their health. I have been pronounced by many medical men, by whom I have been examined, to be a man of strong constitution, yet, after working the wet process out of doors last year, I found that the bronchial tubes were much affected; and this year the symptoms have again returned. I attribute this to inhaling the ether in the tent, the confinement in which, even for a limited period, in warm weather, operates injuriously on the lungs, and exposes the operator to cold on emerging from it. Although strongly devoted to the art, I cannot afford to sacrifice health in its pursuit, and I have therefore resolved never again to work with collodion in a tent. A developing-box, on the principle of Archer's camera, appears to me in every way preferable; but best of all would be a system which dispensed with collodion altogether, and such a system is that of Mr. Archer, of Manchester. The albumen process is the least expensive of any, while it is productive of results which those of collodion cannot surpass—all that is wanted being increase of sensitiveness; and I have no doubt this end will be attained, if photographers will take up the process with the view of working it out to perfection. Even in its present state it is equal to most dry processes in rapidity, and superior to them in certainty, while the difficulty of obtaining an even coating of albumen, which was the chief obstacle in the old process, is now obviated. To an intelligent amateur, who has time to devote to it, I know of no process more promising, and certainly none the practice of which is less likely to injure the health.—I am, sir, yours respectfully, AN AMATEUR.

Photographic Notes and Queries.

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SOLAR PHOTOGRAPHY.

SIR,—I am anxiously looking out for your next issue of the "NEWS," to know how our wise men got on in Spain and in this country. I also was prepared with my movement-instantaneous, but, unfortunately, being engaged professionally (the poor country *doctor* can't always go in for a plate, for sundry reasons), it was past 1 P.M. before I could get home, and nearly 2 before a plate could be got ready; but it rained so continuously, that there appeared little chance of doing anything. However, about the time of the greatest obscuration, I took a view of a house opposite—raining fast—heavy, dark clouds—Keene's collodion—negative next—eight seconds' exposure, short focus—quick ¼ plate, double lens—came out a very faint positive. Twenty minutes later, circumstances much the same; good positive. At about 3.20 I had all right for a snap, just going to uncover the lens, when up goes the cloud-curtain—plate spoiled—dipped another—got savage—struck the cemented slip of dipper against side of bath—off it goes—off goes the moon's shadow, and off goes I. Soon, however, after the soothing effects of a pipe, I forgot my troubles; and consoling myself that crack hands had doubtless met with success, the "NEWS" of to-day has verified my suppositions. I anxiously wait for Saturday next. I hope, Sir, you will publish the best photographs of the eclipse in the "NEWS." I should not object to pay ten times the price of the paper to get the prints. Rejoicing in your success, I have the honour to remain, your constant subscriber, CHURK.

Hayle, Cornwall, July 21, 1860.

P.S.—I think it was stated that, at the last eclipse, the actinic power of the sun was as great, during the greatest obscuration, as it was when no such an event was taking place.

SULPHUR-TONING.

SIR,—From the nature of some remarks that have been made to me in connection with my communication on "Sulphur-toning," printed in your last week's number, I am inclined to think that, if my suggestions be incautiously acted upon, failure will ensue. In the first place, it is important that the sulphuric acid be of the full strength, monohydrated, sp. gr. 1·85. As the quantity added to the hypo. is relatively so small, this salt would not be fully decomposed unless a definite quantity of sulphuric acid be present to effect the decomposition. I succeeded in obtaining the desired violet tones upon the first trial, and if I have sometimes failed, it has been with badly albumenised paper. In some instances the pictures have come out exceedingly weak, as if insufficient silver remained on the proof after being washed. Proofs of that class I immerse at once, after taking them out of the printing frame, when they tone clear and deep. Unlike the slow action of the gold toning-bath, the action of the sulphur bath is very prompt; and if the proofs are not toned in one or two seconds, they will not tone at all. There is no use in allowing them to remain in the bath, for they are quickly destroyed, the colour passing to an opaque greenish-black, and the whites turning yellow. I have no sort of doubt about the integrity of this mode of toning. To-day I have examined several hundreds of sulphur-toned prints, which have been kept loose in a drawer for a couple of years, in a room without a fire; not one of which shows any sign of fading. I beg to inclose a few for your inspection, to satisfy any doubts that may happen to exist in your mind on the subject.—Yours, &c.,

London, July 24, 1860. CHARLES MARTEL.

TO CORRESPONDENTS.

A LADY PHOTOGRAPHER.—Pictures on albumenised paper can be toned by the sulphur process. The strength of the hypo. solution in which they are first immersed is immaterial; about two ounces of hypo. to the pint of water is a fair strength. The cause of your failure may be that your sulphuric acid was too weak. If the proof is not toned in a minute, it will be utterly destroyed. As for an hour's immersion, it is entirely out of the question. In your next experiment, immerse a proof immediately after it is removed from the printing-frame, without previous immersion in the hypo. bath. Whenever the process has failed in our hands, it has arisen from some peculiarity in the albumenised paper.

J. V. P.—An iron developer needs no apology; it is only by accident that pyrogallic acid became more popular. Your negatives are perfect: plenty of detail, fine gradation, and harmony of tone. It is impossible to produce better, by any kind of developer. So far from concealing the fact, these negatives may be shown as triumphant proofs of the superiority of an iron developer.

CASTRA CAMPANA.—1. There is no prescription for obviating the mottled appearance, besides careful manipulation in the developing. 2. We have nothing to add to the details already given of the raspberry-syrup process. 3. Send proofs to the London Stereoscopic Company. 4. If the deal box is first *dried* in an oven, and then thoroughly coated with lac, we apprehend there would be no risk.

LOOK BEFORE YOU LEAP.—Your glass house appears to be very well planned. You will, however, probably find an excess of light, which will cause your portraits to present a flat appearance. This can be obviated by inclosing your sitter in a space of about four feet by two, formed of curtains of unbleached calico or similar material, and a suitable background.

ARTHUR.—The principles of instantaneous photography have been so recently laid down in the "PHOTOGRAPHIC NEWS," that it cannot be necessary to repeat them. A perusal of the articles on that subject by Mr. Warren De la Rue ought to be sufficient to put you on the track of successful practice.

A. HAWES.—Longer exposure is not required, with citric acid in the developer. The development is more gradual, and, consequently, more under control. The best developer for your purpose will be protoacetate or protonitrate of iron. (See No. 92, p. 65.)

OSCAR.—If you obtain a satisfactory result in toning your positives, it is of little consequence by what means. The causes of fading are pretty well understood, and a perusal of Messrs. Davanne and Girard's researches will clear up any doubts or misgivings you may entertain.

J. M.—The best beginning for a young photographer is with positive printing. Any practical photographer will sell you a negative. If you commence with "taking pictures," you will have to wait till you have mastered the printing process before you can turn them to practical account.

VANISHING-POINT.—The advantages of photography in your profession of architect and surveyor are so obvious, that it can scarcely be necessary to ask our opinion or advice. We can but recommend you to avail yourself of its resources.

LIGHT.—Sir John Herschel's "Treatise on Light" is to be found in the "Encyclopædia Metropolitana." It has not been published separately. We know of no work that can be substituted for it. Not long ago, we saw an enthusiastic student in the British Museum copying it verbatim!

M. A. O.—Three out of the four possess considerable merit. The view of the greenhouse does not possess much interest. We regret to say that the scheme is at present in a dormant state.

L. L.—In the absence of a glazing-press, you may impart a gloss to your pictures by coating them with a varnish of Canada balsam, diluted with turpentine.

PYRO.—We have not found the extraordinary difference in the various collodions you mention. Probably you did not leave the *bad* samples sufficient time to deposit the substance that causes spots in the film.

GALLIC.—We have found it advantageous to avoid using all solutions, except the fixing agents, until they have stood four and twenty or more hours to settle.

ANNIE.—Your proofs are considerably underprinted, hence their weakness: probably your sensitising bath was too weak; its strength diminishes very rapidly.

W. KENYON.—We know of no particular collodion that can be recommended for your purpose. If you wish for negatives, why not obtain them in a direct manner?

J. N. S.—It is difficult to describe the improved form of the instrument without diagrams. We will endeavour to give a description of it in next week's number.

T. WHARTON.—The blue colour of your collodion film shows that it is deficient in iodide. Add more iodising solution in small quantities, until the sensitised film shows an opaline aspect.

FUMO.—Smoking tobacco in your operating-room is very injudicious, to say the least of it, and it is probable that the spots on your negative are caused by particles of the tobacco ashes. You are the slave of a bad habit.

OVO.—There is a general complaint of the bad qualities of albumenised paper. As we are not in the secret of its manufacture, we cannot enlighten you as to the cause of the defects.

T. T.—The cost of a stereoscopic outfit need not exceed five pounds. When you have mastered photography on this scale, you can proceed to larger pictures.

CROTCHET.—To do as you recommend would have the effect of narrowing the scope of photography to a most absurd extent—dwarfing a giant. The art is of a very expansive nature.

JANUS.—Chemical nomenclature is constantly undergoing changes. An old treatise on chemistry will teach you many things that you will have to unlearn.

X. K.—There is no book on the subject, nor is one needed. All essential details are given in the "PHOTOGRAPHIC NEWS," No. 80, p. 336.

J. LANE.—The density of the acid should be 1·85; the strength of the hypo. bath is immaterial—about 10 per cent. is an average.

N. P.—Your negative is over-developed; hence the violent contrast between the light and dark portions of your proofs.

PHOTO.—The book is reviewed in the *present* number of the "PHOTOGRAPHIC NEWS."

⁂ All editorial communications should be addressed to Messrs. CASSELL, PETTER, and GALPIN, La Belle Sauvage Yard, London, E.C.

THE PHOTOGRAPHIC NEWS.

Vol. IV., No. 100.—*August* 3, 1860.

IMPORTANT PROGRESS IN PHOTOGRAPHY.

Photography would appear to be rapidly attaining its culminating point, where the greatest simplicity in operations will produce absolute certainty in results. Two important steps in this direction are recorded in the present number of the "Photographic News," in the discovery of M. Disdéri's *photographic ink*, and M. Bertsch's *automatic camera*. The properties of the former have been examined and reported on by no less an authority than the learned Abbé Moigno, therefore the value of M. Disdéri's discovery cannot be questioned. The only drawback to the pleasure this announcement is sure to create, consists in the composition of the photogenic ink not being divulged, probably because it is M. Disdéri's intention to patent his invention; it is to be hoped that he will not keep the photographic world long in suspense.

With regard to M. Bertsch's invention of the automatic camera, it is the result of the introduction of Mr. Woodward's solar camera; an investigation of the principles of its construction led to the important discovery that amplified pictures are better than those taken at once on the larger scale. The apparatus of the travelling photographer will now be reduced to the compass of a sandwich box. The process of taking views is reduced to a merely mechanical operation, and the complicated art of photography is brought down to the meanest capacity.

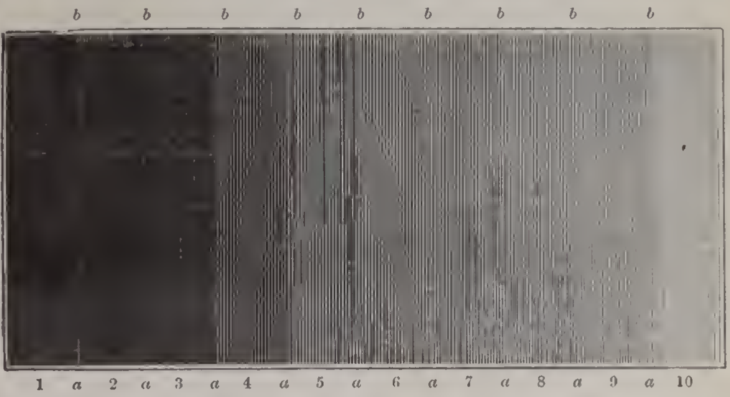
The simultaneous discovery of two such important improvements in the art of photography cannot fail to increase the number of its disciples. Many who have desired to enter upon the practice of this fascinating art, have doubtless been deterred by the difficulties attendant upon its delicate operations and processes. These are now reduced to a minimum. The entire photographic apparatus, including camera, chemicals, paper for printing, &c., in sufficient quantity for a lengthened tour, may be packed within the compass of a lady's writing desk. An hour's instruction from an adept will be sufficient to convert the timid amateur into the accomplished artist.

COLOUR IN ITS RELATION TO PHOTOGRAPHY.[*]

BY CHARLES MARTEL.

The photographer depicts his subject in monochrome; it is therefore incumbent on him to study and analyse the laws which affect the view, both of coloured bodies and those which are represented by the various tones of a single colour, as in drawings in umber, bistre, sepia, China ink, and in photographs.

In the view of coloured bodies, their actual colours are greatly modified *to the eye* by the effect of contrast arising from the contact or juxtaposition of coloured surfaces. This view gives rise to contrast of colour, a very complicated subject, and to contrast of tone, or intensity. The optical effects of contrast of colours cannot be shown without the aid of coloured diagrams, but the contrast of tone may be shown by the following wood-cut, which may be supposed to represent a piece of card-board, shaded with washes of China ink, decreasing in strength from 1 to 10. Now, although the tints are perfectly flat and uniform throughout their entire surface, yet, at the line of contact, *a b*, the eye appears to perceive a modification which extends some distance into the tint, the effect of which is to make the dark tint darker, and the light tint lighter, over a given portion of its surface; the flat tints do not appear flat, but as if they were shaded so as to produce a gradation of tone, and the union of the stripes resembles the grooves of an Ionic column. That this effect is an optical illusion may be proved by covering up one of the tints, when its optical effect upon the adjacent tint will be neutralised, and the latter will appear, not channeled, but flat, as it really is. A painter, ignorant of this optical effect, if called upon to represent two contiguous bands of different tones, would represent them as they appeared to his eye, and paint them as grooves, and depict a gradation of tone where none existed, and, consequently, exaggerate the natural effect.



Now this effect of contrast of tone occurs whenever flat surfaces of different tones are in juxtaposition, and if it occurred exactly where it was required by the artist, it would have the result of heightening the effect of chiaroscuro. But as the contrary is the case, the photographer must make allowance for the optical effect so produced, and when he has it in his power, control it, by arranging his model so as to avoid what may sometimes be an objectionable feature in an otherwise well-composed picture. Contrast of tone takes place with colours as well as with grey. If two bands of the same colour, but of different tones, or two bands of different colours of the same tone, be placed in contiguity, the edge of the light band in contact with the dark band will appear lighter, while the edge of the dark band in contact with the light band will appear darker If the bands are of different colours, there will be an additional modification, arising from the simultaneous contrast of colours: thus, if the bands be red and green, the red will not only appear lighter in that portion of its surface next to the green, but its colour will also be modified, it will appear of a purer and brighter red; and a similar effect will also take place in the appearance of the green band. It is necessary that the bands be of a certain size for this effect to be produced; at least an inch in diameter.

It is not possible to pursue this subject further in this place; our object is merely to point out the existence of the phenomena, so that the artist-photographer may not overlook its influence in his productions. The subject will be found fully investigated in M. Chevreul's work on "Contrast of Colours"—a work which will well repay perusal or study. It shows that the sight of colours is not so simple a matter as is generally supposed, but that certain optical and physiological laws interfere, and mislead our judgment. A knowledge of these laws gives the artist the power of turning the phenomena to his advantage, and of obviating the errors he must inevitably fall into when ignorant of them.

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[*] Continued from vol. iv. p. 146.

The colour of a photograph should be, in some degree, in harmony with the subject it represents. The artist has a number of hues at command by varying the toning-process, and he can apply such hue as he considers most suitable to the subject. The warm or red-brown tones will probably be preferred for views of old buildings, ruins, &c.; while the deeper hues of violet-brown will best accord with a general landscape; the violet and purple tones will harmonise with subjects in which a sombre effect is desirable; and these hues will doubtless be generally preferred for portraiture.

The means of obtaining particular hues are well known to most practised photographers; it is, therefore, not necessary to repeat them in this place. One remark, however, on the pure black tones so much coveted by certain photographers. It is necessary to proceed very cautiously in this direction, as the effect of the black mingled with the yellow of the albumened surface of the paper, is to produce a dull olive-green hue, which is anything but pleasing to the eye. We constantly meet with photographs in which the tones, although purple, are so near black in appearance, that they would be pronounced black by most persons. The red in the hue is in minimum proportions, just sufficient to neutralise the blue in the purple, and while deep hues of this quality can be obtained, it appears to us to be a work of supererogation to seek for black.

It only remains to speak of portraits with white backgrounds, or rather with no backgrounds, *vignetted*, as they are termed. There is no accounting for tastes; this class of productions appears to meet with some favour from the public, therefore the artist must conform to the taste, or rather no taste, of his patrons. The mechanical photographer must be delighted with a fashion which so greatly facilitates his labours, for nothing can be easier to make than a white ground, and if only the face be preserved intact, there is many a portrait rendered available, which otherwise, from defects in the background, would have to be condemned.

It is absolutely impossible to obtain on a white background the same amount of relief that a neutral or dark background will afford; for if, to attain the desired relief, we print the portrait darker, the picture becomes intolerably coarse, as if it had been retouched. A background of a light neutral tone may sometimes be very appropriate; but in an artistic sense, a white background is intolerable.

This subject of background gives photographers much unnecessary anxiety and trouble. When Sir Joshua Reynolds was asked by a pupil "of what he should make his background," the answer was, "of nothing." This rule emphatically holds good in the photographic portrait. There the background should represent—nothing—nothing but space, as distant as possible from the head. By this mode of treatment, the head and figure gain in solidity and relief, and stand out vigorously and boldly from the canvas.

(*To be continued.*)

ENLARGING COLLODION PICTURES.*

ON AN AUTOMATIC CAMERA.

BY M. BERTSCH.

In recognising, in my last communication, that the effect of relief and aerial perspective in photographic proofs is due, in great measure, to the relations between the foreground and the distant planes being well preserved, I said that there was a great advantage, in an artistic point of view, in taking on the spot small views of the landscape (which could be afterwards considerably enlarged) by means of objectives, the distinct view of which begins near the eye, and preserving the same relations between the different planes. Taken under these conditions, these little proofs, resembling those in which we ourselves see nature, and in the manner in which painters copy it, we obtain, when they are enlarged and projected on a screen, an impression of real stereoscopic relief; and if the enlarging does not cause them to lose their fineness, as I have proved by the large proof now exhibited, the effect will be truly striking. I have, therefore, sought the means of obtaining, with an irreproachable sharpness, the little negatives which serve as types. I have now the honour of presenting to the society a small camera which fulfils all the conditions of success for obtaining proofs intended to be enlarged. It is four inches square, and will carry a plate 2$\frac{3}{4}$ inches, sufficient for a stereoscopic view, and has neither focussing-glass nor frame. Focussed mathematically true for every distance beyond twenty paces, the operator can use it without troubling himself with the difficult task of focussing; its objective carefully constructed, achromatised by a very dispersive heavy flint, notwithstanding the shortness of its focus, is aplanatic over a field of 2$\frac{3}{4}$ square inches, with an angle of aperture of 33°. As the focal image cannot be seen, I have introduced a little quadrant into the camera, which is placed above it. This quadrant, composed of a circular guide with a square opening crossed with thread, and a spirit level, permits of the verifying at a glance the verticality of the apparatus, and the image it is desired to obtain on the focussing-glass. When the objects are comprised within the square of the quadrant, it is certain that they also projected on the glass plate.

The camera is placed on a stand which folds up into a walking-stick, the height of which is calculated for the field of vision, to form at twenty paces an angle of 15°. Under the conditions in which this camera is constructed, we may be sure that, from the foreground to the horizon, all the landscape comprised within the quadrant will be reproduced on the sensitive plate with perfect sharpness, which will permit of the proof being enlarged up to 24 or even 30 inches. When the images from these little negatives are cast on a screen of these dimensions, we are astonished at the fineness of the details, at the integrity of the several planes, and at the relief that results. Examined by the microscope, the same perfection is recognised. The hour on a public clock, situated at 1,600 yards distance, may be plainly seen, and so also may the bars on the sails of a windmill in the extreme distance, as well as the minutest details on objects at twenty paces distance.

I will now enter upon the details of this little camera obscura, beginning with the focussing. This is, beyond all dispute, the most difficult and most important operation connected with the enlargement of proofs. Few persons succeed in it, even with ordinary proofs; and I may venture to say, that a strictly good focussing is quite impossible when we make use of a translucent body, however fine the grain, to receive the image. The only means of arriving at it correctly, is to make this operation on the aerial image considerably amplified. But two sources of error occur even in this case to disturb the results, if precaution be not taken. The first, well known to every one, is the chemical focus, from which no objective is exempt, whatever may be asserted to the contrary; the second is what may be termed depth of focus—a phenomenon which has the effect of removing the image to a different plane than that where it is perceived by the eye.

In a simple lens the difference between the visual and chemical foci is strictly proportional to the distance of the image from the optical centre. I easily obtain its coefficient for all distances, in taking the proof of a radiated and inclined plane at such a distance from the principal focus as when the image is enlarged five times. The apparatus I employ carries a vernier, which marks the 1,000th of an inch. I can, therefore, without difficulty, calculate and determine the chemical focus for every distance up to infinity. As to the second phenomenon, which is explained by the laws of refraction, in virtue of which the image is removed from the plane where it is perceived by the eye, its influence upon the sharpness of the image is still more evident: it is proved by the fact, that after taking the chemical focus into account, if we focus a lens with a microscope and a parallel glass marked with a diamond, the proof we shall obtain will be confused, and composed of several superimposed images.

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* Continued from vol. iv. p. 113.

To obtain the quantity of the image's displacement, we have only to divide the principal focal distance of the amplifying system by that of the objective; the difference is the coefficient of the depth of focus.

The apparatus that I have constructed to determine strictly all the elements I have alluded to, enables me to regulate, with the completest exactness, the place of the micrometer, and, consequently, of the sensitive plate. The anterior and posterior faces of the camera obscura, worked mechanically on the support, are parallel; the sides, made of brass, cannot collapse; the slides and frames are dispensed with, so that every source of error that can arise in the position of the plate, relatively to the objective, is avoided.

With this instrument, which I call the *automatic camera obscura*, because it works, in a manner, alone, operations in the open air, even with wet collodion, become a mere trifle, while the baggage is insignificant. As the pencils constituting the image are very acute, on account of the accuracy of the focus, the impression is very rapid, and admits of figures in motion being taken.

If it is desired to work with dry plates, a knowledge of photography is superfluous, for it will suffice to place a box of prepared plates beside the camera, and cover them with a black or yellow cloth, under which the hands can be introduced; and then place one of the plates in the camera and uncover the lens for three or four minutes, for an albumened plate, or the tenth of that time for a preserved collodioned plate. On returning home, they may be developed and enlarged, and they will have at least the merit of being obtained without much trouble, and of supplying a very vivid souvenir of the various things seen. In giving the rule to be followed for focussing mathematically, and relieving photographers of this operation, impossible to perform well in the open air upon such small images, I think I have made a step in advance in the matter of enlargements; for the good proportions of the type, and its perfection, are the first conditions to be fulfilled.

Although I do not admit that a small portrait enlarged can ever be as good as a large portrait made directly with a first-rate double lens, yet I am also engaged in this application, which will yield interesting results, to the two terms I have indicated, and which become variable in the working of double objectives. I now add a third term, also variable with the distance. This term is the optical centre, which is fixed only for the principal focus, and changes with the relations of the conjugate foci. The problem then is, in this case, much more difficult to solve; for the chemical focus, in always remaining proportional to the distance of the image from the optical centre, cannot be estimated by a whole number, as this latter point varies with the relations of the conjugate foci. In arranging tables of chemical foci, we must, especially in enlargements, take account of this source of error, and that, too, without any complex instrument; it is, therefore, not easy to put theory into practice. Nevertheless, in varying the distance between the two lenses in the double objective, we can bring the optical centre to a fixed point, and I hope soon to be able to submit a new instrument which will permit of our obtaining portraits sharp enough to admit of being enlarged to the size of life.

PHOTOGRAPHIC INK TO SUPERSEDE NITRATE OF SILVER.

BY THE ABBÉ MOIGNO.

This title may appear rather strange, yet it is strictly correct; it will certainly make the tour of the world, and we are glad to be the chosen medium of rendering it popular. The new substance, whose existence and excellent qualities we now make known, is a white salt, crystallised or fused, similar to nitrate of silver, which also might be called photographic ink, since its function is to create the blacks of the proof by the deep colour it assumes under the influence of light and the organic matters contained in paper or collodion. But it is not a simple salt, like nitrate of silver; it contains only a single metal and a precious one; it is a compound salt, or a mixture of metallic salts, of which we can give neither the secret nor the theory. What we have to establish is, that in wanting the material or venal value of nitrate of silver, the new compound salt has lost nothing of its photographic value; that, on the contrary, it possesses, to a degree exalted rather than enfeebled, all the excellent qualities of nitrate of silver. This equality, or, rather, this superior efficacy, with a greatly reduced material value, results from a great number of experiments pursued for a long time by one of our most energetic photographers, M. Disdéri. We have before us, while writing this article, a large number of photographs, whole-plate size, and visiting cards, obtained with the new salt, and we can affirm that they leave nothing to be desired; the colour is a fine black, the whites are very pure, the harmony of tones well preserved, the chiar-oscuro well sustained; and it is absolutely certain that the photographic ink may, from this day, completely replace nitrate of silver. This substitution will also effect a very agreeable revolution in the expense, as the saving will be 30 per cent., or nearly one-third.

Another advantage of the photographic ink employed for positives is, that the sensitised paper can be prepared a long time beforehand, and that it is not necessary to keep it in preservative cases; it may be left hanging up in the operating-room for six, eight, or even fifteen days.

The ink positives are certainly more permanent than positives obtained with the nitrate. No particular kind of paper is required; any kind will do; provided it be of good quality, it will yield excellent pictures. There is no change in the process, either in the preparation of the baths or their employment; the processes of fixing with hyposulphite of soda and toning with chloride of gold remain exactly the same. Photographers will not be required to change their present habits; only particular care must be taken not to fix pictures taken in photographic ink in the baths which have been used to fix or tone nitrate proofs; the contact of the two salts will cause double decomposition, and spoil the bath.

If, as usually happens after using a bath of nitrate for thirty large proofs, the bath of photographic ink becomes weaker, and yields pale and weak proofs, showing a tendency to become turbid, it may be strengthened by the addition of fresh quantities of the salt, and its limpidity becomes restored by means of kaolin.—*Cosmos.*

GENERAL OBSERVATIONS ON PHOTOGRAPHIC POSITIVES.*

BY MM. DAVANNE AND GIRARD.

We will now consider the primary cause of the decomposition of the hypo.-bath, that is to say, the saturation of the hypo. by argentine compounds. From what has already been stated, this limit of saturation is easily arrived at; for, as has been shown in preceding reactions, the danger occurs, theoretically, only at the moment when the insoluble and easily-decomposed compound $(AgOS_2O_2)(NaOS_2O_2)$ is about to be formed. Now this moment is easily ascertained: it results from the two reactions (*b*) and (*c*) which, combined, may be resolved in the following manner:—

$$S_2O_2NaO,5HO+AgCl.$$
$$=S_2O_2AgO,S_2O_2NaO+NaCl+5HO.$$

If we calculate the preceding formula, we shall perceive that, for this reaction to take place, it will require 100 of hyposulphite of soda, and 0·38 of chloride of silver. It is therefore only when the hyposulphite employed will have dissolved about a third of its weight of chloride of silver that the proof will incur the risk of being charged with sulphur.* This is certainly a large proportion; photographers seldom reach it, for it corresponds to the fixing of fifteen whole sheets in 35 ounces of a solution of hypo. of 10 per cent., or one sheet to every three ounces of a solution of hypo. of the strength of two ounces of the salt to a pint of water. Thus it would be difficult to understand the rapid alteration of the fixing bath, if a new and important cause did not intervene to hasten their decomposition — the action of light.

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* Continued from vol. iv. p. 147.

Action of Light.—If in a solution of hyposulphite of soda we dissolve chloride of silver in various proportions, from one-hundredth of its weight until it has greatly exceeded the point of saturation, that is, a third of its weight [in the latter case, much crystallised salt will be precipitated $(AgOS_2O_2)(NaOS_2O_2)$], and if we divide each of the liquors into two portions, and allow the half of each to be exposed to the light, while the other half is kept in total darkness, we discover that at the expiration of a time more or less long, varying from a few hours to several days, all the solutions exposed to the light become turbid and decomposed by depositing sulphide of silver.

On the contrary, those which have been kept in complete obscurity undergo no alteration, even after the lapse of four or five months, but remain as limpid as when first prepared.

This action of light, hitherto unrecognised, appears to be of the highest importance with regard to the decomposition of the bath; moreover, it is so marked, that in a room into which yellow light only enters, it eventually makes itself felt, although in a much less degree than in full light. It is to light, much more than to the limit of saturation of the hypo. by argentine compounds, that are due those solutions which are designated by photographers as "*old hypo.*" And these solutions, as we have previously shown, are nothing else than agents in sulphuring the proofs, and must, consequently, concur more or less rapidly in their alteration.

Photographers desirous of preparing permanent proofs, will recognise the necessity of adopting new precautions, which may be summed up as follows:—

1. Operate as much as possible in diffused light, and not in full light; keep the dish containing the bath constantly covered with a board, or other opaque substance.
2. Never make use of the same solution of hypo. more than once. A few words will suffice to explain the motive and value of these new precautions.

As to the first point, light acts so rapidly upon solutions of hyposulphite of silver in hyposulphite of soda, that, if they are concentrated, a precipitate of sulphide of silver will make its appearance in a few hours. Now this precipitate which deposits from the liquor must be formed in contact with printed proof with much greater rapidity; the extremely rapid decomposition of the double hyposulphite S_2O_2NaO, S_2O_2AgO in presence of water, or under the action of light, is an excellent proof of it. There is therefore a real danger in leaving, only for a few hours, a fixing-bath exposed to the action of light, especially if the latter is energetic, and the bath already charged with salt of silver. In this case, in fact, the hyposulphite of silver, by its decomposition, produces in the substance of the paper an almost simultaneous deposit of sulphide of silver and sulphur, which, sooner or later, must affect its permanency.

As to the second point, it is perhaps still more important than the first. Under the influence of the solar rays, the solution of the salt of silver in hypo. undergoes, as we have shown, a decomposition; but, if once begun in the light, this action appears to continue in obscurity. Chemical analysis explains this fact; for, in carefully examining the composition of solarised baths, we discover that the precipitation of the sulphide of silver is accompanied by the formation of acids of the thionic series, which, at first saturating the decomposed hyposulphite of soda, are not slow in becoming decomposed themselves, in giving birth to new quantities of sulphide of silver, which, depositing in a successive and continuous manner, end in removing from the bath all the silver it contains. So that a fixing-bath containing salts of silver, after being submitted to the action of light for several hours, produces in the dark, sulphurising compounds, thionates, which, if put in contact with a fresh proof, will cause at least a partial sulphurisation of the latter.

The preceding considerations explain and justify—at least, we believe so—the precautions we have advised, which consist, on the one part, of sheltering the hypo. during the fixing as much as possible from the light, and in the other, of never using a fixing-bath more than once.

The last cause of the altering of fixing-baths, and, consequently, of the proofs immersed in them, is due to the addition of certain acids to the baths, such as acetic acid. This method, recommended some years ago, is nearly abandoned now-a-days, and therefore need not occupy much of our attention. A fixing-bath prepared in this manner must necessarily cause a deposit of sulphur on the proof, according to the following reaction:—

$$(d)\ C_4H_4O_4+S_2O_2NaO=C_4H_3O_3NaO+SO_2+HO+S$$

This deposit, which is formed rather slowly, is more or less considerable, according to the quantity of acid employed, but it is constant, and the simultaneous presence of sulphur and of silver on the proof necessarily produces, sooner or later, an alteration in the latter. This acid-bath must therefore be absolutely rejected.

Therefore, without anticipating the practical conditions of fixing, which will be treated in a special article subsequently, we may at present state that the proof, on being taken from the printing-frame, must first be washed in water, which, removing all the free nitrate of silver, diminishes the quantity of silver placed in contact with the hyposulphite, and, consequently, economises the latter; that the washing the proof in salt water, to transform the nitrate into chloride, is superfluous, for it diminishes in no respect the quantity of silver put in contact with the hyposulphite, and consequently does not retard the moment of saturation; that a washing of bicarbonate of soda may be advantageously substituted for it; lastly, that the bath of hypo. must be employed only for a limited number of proofs, for its dissolving energy may, owing to its saturation, and especially to the influence of light, at the end of a certain time, become replaced by a decomposing action. We shall resume this subject when we establish the practical conditions of a good fixing.

According to our experiments, the double hyposulphite of soda and silver acquires a great stability in presence of certain salts, such as nitrate of potash, common salt, &c., which justifies the practice recently proposed, of saturating the hypo.-bath with common salt.

(*To be continued.*)

ON THE ICONOMETER, OR VIEW-METER.

The first idea of this useful instrument for photographers is due to the late M. Ziegler, an eminent artist and enthusiastic photographer. If it has remained comparatively unknown, and but little used, it is, doubtless, due to the imperfection of its construction. The service it is daily capable of affording renders it of inestimable value to those who seek its aid, and it is a matter for surprise that an instrument so capable of improvement has not hitherto received it.

The view-meter is made in the form of an opera-glass. A. It is monocular; the eye-piece consists of a very convex lens; the object-glass is replaced by a piece of ground glass. The telescope, 2in. in length, is formed of a tube sliding within the outer case, which increases the length, at pleasure, another 1½in.; the ground glass measures 1¾in. by 1¼in. In fact, this telescope is merely a little camera obscura, and is used by looking through the eye-piece upon the ground glass, and focussed by shortening or lengthening the telescopic tube.

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* It will be understood that if we employ a hyposulphite of soda which is nearly saturated by the silver, the quantity of hyposulphite necessary for the fixing is distributed through a great mass of water, and can act but feebly, while the salt of silver is collected in excess, as it were, upon a point, and cannot effect a rapid decomposition of it, as the hyposulphite is supersaturated.

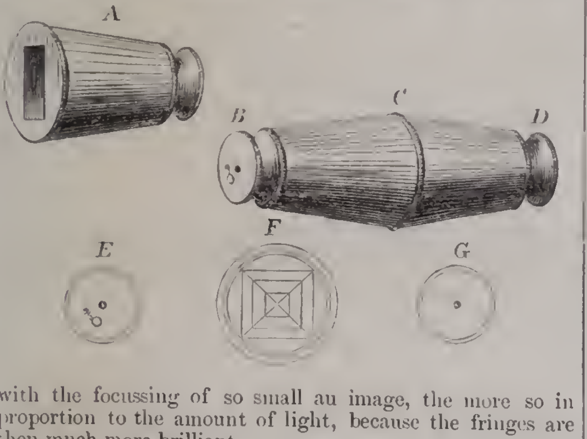
Now, it is well known that this operation of focussing is a difficult operation with the camera in broad daylight, and still more so with this little instrument, which admits so little light; moreover, it is well known that the most favourable position for photographing an object is when, turning our back and the instrument to the light, it returns, reflected by the object, to concentrate itself upon the sensitive plate. Now, if we place ourselves in such a position, or in a similar one equally favourable, with the sun a little oblique, it is almost impossible to guarantee the object on the ground-glass of the iconometer.

We will stop at this point, and explain what office the iconometer performs. Its name indicates that it "measures images," and, in fact, it gives their dimensions. It does so in this manner: If we trace upon the ground glass a scale of height and breadth, previously establishing an exact relation between the image of a given space produced by an objective, and the image given of the same space by the lens of the iconometer, we can reverse the problem, and say, being in any given space, if I direct my iconometer to an object, I shall have, by measuring the scale, the size it will come upon the ground glass in making use of a certain objective.

But this is not the limit of its services. It is particularly useful for finding the point of view. It assists us in suitably placing the objects on the plate neither too high nor too low. In a word, it assists in the artistic construction of a view, the beauty of which depends upon the aspect under which it is viewed and taken. Thus, it indicates not only the size of the image given by a certain objective, but also the exact spot where we should place the camera to obtain the best effect.

The following are the improvements in the instrument suggested by M. Henry de la Blanchère, which can be effected at a very trifling cost:—

1. The instrument, B C D, is furnished with an achromatic lens at D, because the coloured fringes greatly interfere with the focussing of so small an image, the more so in proportion to the amount of light, because the fringes are then much more brilliant.



2. That the little aperture in E be closed at pleasure by an eccentric cap, *m*, in order to prevent the admission of dust upon the lens, to which it is much subject, from being carried in the pocket.

3. That the ground glass be round at C, and that it completely fill the field of the tube, because the relation of the objective employed to that of the lens of the iconometer may be such that the image furnished for the camera obscura exceeds the frame of the ground glass; and although incomplete, may still be marked on the rounded edges by sufficient chords. Although smaller than the sides of a maximum rectangle inscribed at F, this rectangle, such as is made in ordinary iconometers—in A, for example—has scarcely ever its sides proportional to those of the camera obscura made use of.

4. And it is most important that the present telescope is only the half of the improved instrument—that is to say, that a second tube be fastened on at the ground glass, and that it be pierced with a hole, G, and that being constructed like the other of two tubes sliding within each other, it is capable of being lengthened, when necessary, to obtain distinct view. With the instrument so constructed, there is nothing to fear from the sun, as the ground glass is completely sheltered from it, and the eye-piece is quite covered by the orbit of the eye. The focussing is always sure and easy; besides, the instrument is still very portable, as, when closed, it is but four inches in length.

SCIENTIFIC GOSSIP.

In a recent number we gave a short account of a new theory which had been propounded by Mr. Seely, respecting the cause of the sensitiveness of the numerous forms of dry collodion, in which the addition of some neutral organic substance to the collodion was advocated. The idea has since been taken up in a somewhat altered form by Professor Sanders, who has followed it out and produced what he calls a xantho-collodion, which seems to possess some important advantages over those in general use. The mode of preparation is somewhat as follows:—A collodion is first prepared by dissolving, in one ounce of a mixture of strong alcohol and ether, ten grains of iodide of ammonium, five grains of bromide of cadmium, and five grains of pyroxiline, made at a high temperature. The solution of the requisite organic matter is then made, which, in this instance, consists of one part powdered turmeric, and four parts of alcohol. These are to be well digested and shaken together, and allowed to stand, with occasional shaking, for some days. One ounce of the tincture of turmeric is to be added to each ounce of the iodised collodion prepared as above. According to the account which the discoverer gives of this collodion, its qualities must be very excellent. Negatives produced by it are very intense, and yet full of detail in every part; when printed, there does not appear to be any tendency for the whites to have that dead appearance termed solarisation. As a dry collodion it is also very successful. The film is so tough that it may be washed with a stream of water without chance of injury, whilst pyrogallic acid may be freely employed as a developing agent, as the brittleness which that body sometimes produces on ordinary dry films does not prove injurious in this case. One great advantage of the xantho-collodion is, that it may be used successfully to produce a dense negative as soon as prepared. It is of a rich yellow colour, and, when it has settled, may at once be used for negatives, positives, or dry plates, as no increase in intensity is obtained if the collodion is kept for some weeks before using. The employment of turmeric as an organic body in collodion suggested itself to Professor Sanders on account of its yellow colour, as he considered that if it were possible to give to collodion a more chemically opaque hue than it usually possesses, the resulting picture would be improved in delicacy of half-tones and intensity: hence the employment of this yellow colouring body. According to the accounts which we have received, the result has fully answered the anticipation, but we are more inclined to attribute the excellence in the working qualities of the coloured collodion to the chemical action of the tinctorial agent than to any effect which its infinitesimal absorptive action, when attenuated in the film, could exercise on the chemical rays of light.

At this season of violent thunder-storms, our readers will be interested to know of some observations which have recently been made respecting the phenomenon of thunder. It has generally been considered that sound moves at a uniform velocity of 1,142 feet per second, and in every book on the subject rules are given by which the distance of any source of sound, such as a fire-arm or a flash of lightning, may be ascertained by estimating the number of seconds and fractions of a second which elapse between the ocularly-observed time of the occurrence of the phenomenon and the hearing of the sound which accompanies it. Doubtless many persons have in this manner amused themselves by estimating the distance off which one of the recent violent lightning flashes has been, and have taken comfort from the idea, that if a certain number of seconds have elapsed *after* the flash has taken place before the thunder is heard, they are safe from its effects; falling into the very common error of mistaking the cause for the effect. The Rev. S. Earnshaw has, however, been engaged in some extremely interesting mathematical investigations respecting the phenomenon of sound, and has arrived at the theoretical conclusion that violent sounds are propagated far more rapidly than gentle sounds, and that therefore all reasoning upon the distance of the flash, based upon the lapse of time between it and the thunder, is fallacious. Many instances of this fact are adduced in corroboration of the theory, in which the clap of thunder followed immediately after the lightning, when, judging from the distance which the latter was from the observer, there should have been an interval of many seconds' duration. These and similar instances have induced the abovenamed gentleman to enter upon a mathematical investigation of the theory of sound, and he arrives at the conclusion, contrary to the hitherto universally received opinion, that there is no limit to the velocity with which a violent sound is transmissible through the atmosphere, provided the phenomenon which produces the sound be sufficiently violent. Hence it is probable that there is no sound which is propagated faster than a clap of thunder, its genesis being especially violent. This theory seems also capable of explaining the rumbling, rolling noise of thunder. It is only necessary to imagine that the sound at its origin is broken up, either by partial interruption or reflection, into several sounds of different degrees of violence. They would thus be propagated with different degrees of rapidity, and would therefore not fall upon the ear, if it were at any distance off, with a sudden crash, but in a series of minor claps, or as a rattle. If this theory be true, the report of a cannon should travel faster than the human voice, and that of thunder faster than either. This, we think, could easily be put to a *crucial* test.

A gentleman, rejoicing in the euphonious name of S. Czugajewicz, has recently taken out a patent for some improvements in stereoscopes. The invention consists of a compound stereoscope, in which general or panoramic views of boulevards, streets, banks of rivers and coast lines, monuments, sea views, &c., may be displayed by means of the gradual unrolling of one or more endless slides or bands carrying pictures. It is immaterial whether the pictures represent one side of a street, &c., or whether they are in perspective, and represent both sides thereof. The distinctive feature of this invention is the adaptation to stereoscopes of one or more symmetrical, independent, movable, endless bands, on which are right and left hand halves, or corresponding parts of a stereoscopic panorama, or succession of pictures. The following is the construction of the instrument:—The top thereof consists as usual of two lenses or eye-glasses, and the bottom thereof is mounted on a box containing rollers on which are wound the before-mentioned endless slides or bands on which are printed, pasted, or otherwise appropriately attached the views or pictures in panoramic succession; also a train of wheelwork for setting the aforesaid bands in motion. The aforesaid bands and corresponding parts of the pictures thereon, are brought under their respective eye-glasses upon a flat stage or platform, over which the bands pass, so that when set in motion, a panoramic stereoscopic view or picture is thus obtained. The description of the instrument is not very clear, we fear, to those who are not acquainted with the effect. We have, however, seen a similar instrument, and can assure our readers that nothing can surpass the beauty and interest of a beautiful stereoscopic panorama moving before the eyes of the spectator.

THE SOLAR ECLIPSE.

Although the arrangements which we had made justified us in promising to our readers a full account of the expedition to Spain, we find ourselves compelled, at the last moment, to forego the publication of the article. We have received an intimation that an official report of the expedition is in preparation, and that it is not desirable that any other account should be published.

The Photographic Tourist.

A PHOTOGRAPHIC TRIP TO BASSÆ.*

BY MAJOR SHAKESPEAR, R.A.

The Temple of Apollo is built on a small plateau, between two summits of a long table-mountain (mount Cotylium), about 5,000 feet above the sea. The view from it towards the east and south is magnificent and extensive; the north and west are closely environed by rocky eminences. The Temple, standing north and south, contrary to the general rule, a person standing in the pronaos sees to his left the snow-capped peaks of mount Tagetus; in his front, the forest-clad mountains of Arcadia; to his right, the huge, flat-topped mass of mount Ithome, rising abruptly from the Messenean plain about Navarino and the sea. Immediately from the Temple, to the south, commences the steep and rocky descent to the glen of the river Neda. About two hours' journey in this direction, along a track as wild and rough as the ascent from Andritzina, is the village of Paulizza—the ancient Phigalea—and to this village and its surrounding district are we indebted for the finest and most perfect specimen of Greek architecture now in existence.

In the year 430 B.C., the plague, in its most fearful form, was brought from Egypt into Greece. Attica suffered more than any other province; but Arcadia, especially about Phigalea, enjoyed an immunity; so its inhabitants, at an enormous cost, caused this magnificent Temple to be erected on a spot in which it could be seen by them, as a thank-offering for deliverance. It therefore was dedicated to Apollo Epicurus, or the Helper, a bronze statue of whom, standing 12 feet high, was placed in the naos of the Temple. Pausanias visited this spot 1,700 years ago; the Temple was then 700 years old, and still in an uninjured state. He describes it as being by far the most beautiful Temple in the Peloponnesus, except that of Athene, at Tagea, not a vestige of which now remains. Of the thirty-eight Doric columns in the peristyle, thirty-five are now standing, and, with four exceptions only, support their architrave. The lower frustra of the four Doric columns of the pronaos and posticum remain in their original position; the lower tier of masonry, composing the walls of the naos, are *in situ*, as well as the bases of the ten Ionic semi-columns which were in the naos; one only of these columns is now standing. A detached Corinthian column stood in the naos, against which stood the statue of Apollo; its component parts are lying about; the frieze is in the British Museum. The Temple was hypæthral, with the exception of 18 feet of roof—once the naos—which gave shelter to the statue. It was twelve o'clock in the day, and the sun scorching hot, before I was able to take my first picture; and as, in consequence of the precipitous descent to Andritzina, it was necessary to leave the Temple in day-light, my time was too short to allow me to take every view in the direction I wished. I had intended to have encamped, and spent three days on the spot, but the loss of time at first starting prevented my doing so. However, I managed to take seven stereoscopic views from different points, as also some measurements, sufficient to enable me to make a tolerably accurate plan to accompany the views, altogether giving a very excellent idea of what this Temple was and now is. They are the first and only photographs of this Temple that have been taken.

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* Concluded from vol. iv. p. 150.

I must not forget a little *contretemps* which bid fairly to put an end to my photographing. There being wind, the guy ropes of my tent were in use. One of the muleteers, who was remarkably inquisitive, would examine my apparatus, which I allowed him to do, as a means of inducing him to satisfy himself, and then to keep away. I was in my tent, when suddenly away went bottles, bath, everything, and almost myself. "Well, it is either a fearful earthquake or the confounded muleteer," thought I. On running out, there was my friend getting up, having tumbled over my tent guys. Now, repeated remonstrance had proved unavailing, so I tried my fist, and knocked him down; up he got and ran at me, fumbling in his girdle for a pistol or knife; so I lost no time in *Heenanizing* him a second time, when he made off, leaving me to bless the provident care that suggested duplicates when starting. Snow was lying in all spots sheltered from the sun, in which we iced our lunch of hard eggs and sherry.

We descended by the same track we traversed in the morning; and, after some blundering in the dark, arrived at our house in Andritzina in 2¼ hours.

On the following morning we had hoped to have made an early start, but it was altogether out of the question. The offending muleteer of the Temple, hoping to make a good thing out of being knocked down, spread a report, which flew like wind over the town, that we ill-treated our men like the Turks. They themselves would not accompany us, nor would any one else supply us with beasts of burden at any price. A crowd assembled at our house to stare and talk at us and amongst themselves, at a pace that negroes and easterns only can talk. Occasionally a most exorbitant price for horses was demanded, and our refusal was met merely with up-tossed eyes and a shrug of the shoulders, which conveys the meaning of the words of indifference—"then don't"—far better than the words themselves. For three hours we were bullied in this way; but at 9 A.M. I went to the head of police, a civil old gentleman, who received me with all his numerous family. He told the muleteer I had served him right, only I ought to have bastinadoed him into the bargain.

Matters now got settled, and we started *en route* for Olimpia. We had not gone far, when the hindermost pony, carrying the panniers of creature comforts and cooking utensils, took fright, and, bolting along the narrow ledge, jostling us in succession, fell heels over head down the bank, scattering our goods broadcast amidst the rocks. This mishap being corrected, we commenced a long and very rough descent into the valley of the river Alpheus. The scene is not interesting, but is very extensive—over undulating low hills; the long ridge of mount Olonos, 7,000 feet, towering above all, in extreme distance closes the view. After passing over some cultivated ground, through an apple orchard, and a small sunny village, we cross a small tributary of the river Alpheus, and, in four hours after leaving Andritzina, we cross the river itself with perfect ease; it is a quarter of a mile broad, and was knee deep, clear, and rapid. We were detained by one of the horses falling with his load, and another taking it into his head to lie down and roll; but in an hour's time we halted at a public-house or wine shop, in the village of Janni, to eat our lunch. There were six huge butts in the back of the shop, from one of which flowed clear, sparkling wine, of a light pink colour, delicious to look at. We tried the taste; it was so cool and refreshing that one felt disinclined to put the glass from one's lips; but the draught over, there remains the obnoxious flavour of turpentine and resin, with which they mix their wine, to preserve it, so they say. In an hour from Janni we are on the banks of the river Phonia. It is broad, rapid, and dirty, from the melting snow in the mountains—flowing between broad shingle banks. The muleteers here remember that they had said it was impossible to cross the river; they get alarmed, and won't cross through obstinacy; so I set the example alone, and, after a little struggling against the foaming current, succeed. A horse can always cross a river where a man can, provided the water is not above the girths; so all crossed well enough. In another quarter of an hour we come to the Ladon river, and formidable indeed it looks—dirty, rapid, and broad; but there is the great sheet of shingle and even flow of water by which to judge whether a ford is practicable. "To cross here is impossible," say the muleteers; "A broader place I see higher up is worse," they say; "it is all quicksand;" and so they try on their humbug. One of my companions and myself enter the river, hand in hand, and are almost carried away; but we get across. Another of the party then tries a horse, but he is washed away; and we, dashing in to save him, are also carried off our legs, and away we go merrily, at the rate of fifteen miles an hour, down stream, striking out manfully, in an oblique direction, for the shore. We soon recover ourselves and the horse, and try that part of the river said to have quicksands. As I had expected, the assertion proved false; for, after a little care, all were successfully crossed. In an hour's time we arrive at the sunny hamlet of Belesi for the night. The inhabitants flocked round us, rather astonished at our passing the river, but were more so when they saw us quietly walk down to the Erymanthus river, and swim about in the rapids while our clothes were drying and dinner cooking. They told us that Englishmen were always very delicate, and that we must therefore be mad; at which we laughed much, and offered a trial of strength or speed with any one amongst them, but all declined. A Greek, from his childhood to his death, never takes off his clothes, except as he outgrows them, in the first instance, or they are in tatters in the second case. This is their idea of hardiness; but, in my many trips, they have never beaten us in walking—they seldom, indeed, equal us—and on the third or fourth day they are invariably done up; but it is hardly to be expected, though they are fine-looking men, their food being only Indian corn bread, that they can be a match for well-fed Englishmen. Our house was tolerably large, but, being built without mortar or mud, the hurricane that blew all night tore through the walls, and made us cold and uncomfortable.

At 6 A.M., 31st March, 1860, we started for Olimpia. Immediately we descend the steep, pudding-stone cliffs, for 200 feet, to the Erymanthus river, which had waxed (as they say on Tweed) considerably from the rain during the night, and, by means of guy ropes to the horses, to steady them in the torrent, cross safely. A gentle ascent of pasture land, and then a plain covered with that beautiful plant, the asphodel, just coming into bloom, occupies one hour, during which time we pass through grassy banks and mounds similar to Roman encampments in England, and enter a wood of pines, stag-headed oaks, arbutus, ilex, and that wild variety of shrub and creeper so common yet so beautiful in the Morea. At 7½ A.M. we came suddenly on a steep descent to the Alpheus. Most truly is this a sylvan scene; its quiet grandeur made an impression not easily forgot. Our path descended through the varied sort of forest I have before described; May-trees were in rich bloom, their white flower appearing in bold contrast to the sombre pine and cypress. Immediately below us wound the broad and rapid river, studded here and there with small islands covered with plane-trees and drooping willows. From the opposite bank rose the pine-clad rocks, near about the site of the ancient Scillus, where Xenophon spent the latter part of his life. At 8 A.M. we are on the edge of the river, and traverse along it for 2½ hours, when we arrive at the remains of the Temple of Jupiter, at Olympia. On the way, our attention was particularly attracted by the sound of bagpipes; we could not detect pibroch or reel, but the note was unmistakable. We soon discovered the joyous sound to proceed from a Greek and an old Egyptian—probably a remnant of Ibraham Pacha's destroying army—who were playing on short instruments of the flageolet kind.

Of the once magnificent city of Olimpia not a trace remains, except a few large masses of broken basement-stones, and pieces of huge Doric columns lying in a hole, amongst rubbish, close to the Alpheus; and but for these—evidently the ruins of the splendid Temple of Jupiter—even the very site of Olimpia would be doubtful; yet, as the last Olimpiad was celebrated in the 393rd year of the Christian era, the city was in existence within the last 1,500 years. The plain runs due north, at right angles to the Alpheus; it is a gentle, well-cultivated slope of about three miles in length by half a mile in breadth. In the distance are pine-clad rocks; the soil is alluvial, and of a red colour. On each side are yellow sandy hills and tumuli studded with pine-trees. I was disappointed with the Vale of Olimpia; it is pretty, certainly, but the great beauty the scene is often imagined and said to possess, in my opinion, has no existence.

We ascend the steep bank on the west side of the plain, and, passing through the hamlet of Droova, enter the village of Phloca, half an hour from the Temple of Jupiter. In 3½ hours, from Phloca, across the plain we arrive at Pyrgos, from whence we may say we started. We get two carts, and jog along for 1½ hours to Katacolo, where we find the yacht rolling heavily from the effects of the gale we felt at Belesi.

My tour is at an end; and, if I am considered prolix in its description, all I have to say is, I write it for my own amusement and recollection hereafter. If it entertains any one, or induces any of the many travellers in Greece, who now pass Bassæ unheeded, to alter their course and view this impressive scene, I shall have accomplished more than I anticipated.

Corfu, June 21, 1860.

ON THE PRESENT STATE OF OUR KNOWLEDGE REGARDING THE PHOTOGRAPHIC IMAGE.*

The next great division of our subject which we have to enter upon is that of photographs produced by development.

Fortunately, in dealing with the images thus formed, we are able to dissever the results from the magic influence that calls them into being. We need only show that certain conditions are necessary for the impress of the invisible image; we are not called on to unfold the character of the impress itself. Without attempting to explain what goes on in the camera obscura, we may determine the conditions for a favourable action in it, and interpret the results of that action after development; though even here, from the great delicacy of the processes employed, the task is a most difficult one.

With regard then, first, to the preparatory portion of these processes involving the production of the sensitive surface. This consists, in the processes on glass, in a supporting film, and generally in iodide of silver formed under conditions in which nitrate of silver was in excess. There are also generally present other ingredients, such as certain forms of organic matter, and in some cases bromide or even chloride of silver.

That it is not a matter of indifference whether the supporting basis or film, consist of pyroxyline, or albumen, or gelatine, or of these severally combined with other bodies or with each other, one might readily suppose from what has been already said under the head of direct processes; and it will be no difficult matter to show more than a probability that this is not due to a "molecular," but to a "chemical" distinction in the action of these bodies.

The usual sensitive surface contains, if it does not consist in, iodide of silver with an excess of nitrate. But there are processes in which the plate is studiously washed with water to remove the nitrate, through which, though it is impaired in sensitiveness, it retains enough of that quality for the production of excellent results. Though this retention of a susceptibility to the invisible impression has been attributed to mechanical causes, such as the state of division of the iodide, the porosity of the film, &c., the following facts seem to favour a chemical explanation. Pure pyroxyline united with pure iodide and nitrate of silver, from which the nitrate of silver has subsequently been removed, and the film dried, is not susceptible of quick development after exposure in the camera; a mere trace of albumen introduced before the removal of the soluble silver-salt, however, prevents its entirely losing this susceptibility. Gelatine, certain forms of sugar, resins, and various other bodies widely differing from one another in point of chemical character, possess a similar property, though the precise regulation of the processes employing them can hardly be said to be as yet mastered by the photographist. The products of decomposition contained in "old collodions," and some of the fresh preparations of pyroxyline, in which secondary products are not studiously prevented from being formed, would seem to share this power with the classes of bodies referred to.

But a question of the utmost interest to the scientific inquirer is involved in the chemistry of the iodide of silver: first, in respect to its power of forming combinations with the nitrate of silver; and secondly, as regards the probability of these combinations forming photographic compounds with the albuminous and other bodies alluded to.

That the excess of nitrate of silver which is necessary in the *first* preparation of all the sensitive films does not act the same part as that excess does in the case of the chloride in direct processes, will be evident at once, inasmuch as the iodide of silver does not undergo reduction in the manner that the chloride does. In searching, therefore, for an explanation of the necessity of free nitrate, the mind naturally dwells on the compounds shown by Schnauss* and A. Kremer† to be formed by the action of strong solution of nitrate of silver on the iodide. Although the production of these bodies in any quantity and in a state of chemical purity needs conditions not present on the photographic film, yet there seems little doubt that, as iodide of silver is dissolved by the nitrate, traces of these remarkable compounds can readily exist in the films containing these two ingredients. If so, the highly photographic character of the compound containing 2·8 per cent. of iodide of silver described by Kremer, and the fact of these bodies being decomposed with the separation of iodide of silver by the action of water, are facts of high interest to the photographic chemist, and seem to throw considerable light on the hitherto obscure processes in which iodide of silver is employed. These two facts, indeed, may be held to explain, very nearly, the character of the ordinary collodion process, but they do not explain the "preservative" processes in which the sensitiveness of the film is, within certain limits, retained by the introduction of albumen, gelatine, resin, sugars, or other organic substances, to the numbers of which experience is continually adding.

For the explanation of the action of these substances, we must recur to the facts already cited in the case of gelatine, when used as a size in the direct processes. Thus, too, a plate coated in the ordinary manner with albumen containing iodide of potassium dissolved, will be found, on being raised from out of the silver-bath, not to be opaque, and coated with a dense deposit of iodide of silver, but to appear highly translucent and opalescent in its character, and that even though the iodide be introduced with a liberal hand. In fact, the albumen is present not merely as a mechanical vehicle for the sensitive materials, but it can be proved to have combined with those materials, and to play no insignificant part in their photochemical transformation. That this is so, may be at once shown by adding some albumen to a quantity of the ordinary "silver-bath,"—say the white of one egg, diluted with 1½ ounces of water, added to 40 ounces of bath. The iodide of silver with which the bath was previously saturated will be found in it no more; it is now to be looked for in the gelatinous precipitate which the albumen has formed. The precipitate is, in fact, a chemical compound of albumen with nitrate of silver holding in combination the iodide. This is, as might be supposed, from what has been said of the albuminate alone, a highly photographic compound. We have stated that a similar compound is formed by gelatino-nitrate of silver and iodide of silver. Citrate of silver, glycyrrhizine, and many other bodies share with these substances, and the first two possess even in a far higher degree than they, the property of carrying down in a combination—or, so to say, in solid solution—the iodide of silver, and forming with it highly photographic products.

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* Continued from vol. iv. p. 152.

* Archiv. der Pharm. xcii. 206.

† Journ. für Prakt. Chem. lxxi. 54.

A hiatus must needs occur in this stage of our inquiry. The sensitive film is exposed in the camera, and in a few instants the invisible image is impressed. We remove it, and our task begins again at a tangible starting-point. The development of the image is the visible evidence that the light has been at work, and a close examination of the nature of this image is the only further key we possess to elucidate the character of the light's action.

(*To be continued.*)

Dictionary of Photography.

PHOSPHORESCENCE.—A property possessed by certain bodies such as phosphorus, of emitting light in the dark, but without sensible heat or combustion. Many insects, such as the firefly and the glowworm, are phosphorescent. So also are fishes, in the living and dead state. Certain plants, also, are phosphorescent. Many mineral substances are naturally phosphorescent, or become so under the influence of friction and heat; such are the diamond, carbuncle, fluor-spar, &c. Sugar, pounded in the dark, emits phosphoric light. Recently the photogenic properties of phosphoric light have been experimented upon by M. E. Becquerel. The results he has arrived at have been fully detailed in this journal.

PHOTOLITHOGRAPHY.—The application of photography to lithography, by which the photographic image is transferred to stone, and impressions of it are obtained in the ordinary manner. The conditions necessary are to coat the surface of the stone with a uniform layer of some substance sensitive to the action of light, but which may be removed by the action of a solvent from all those portions of the stone upon which light has not acted. Bitumen dissolved in ether appears to be the substance first employed; before it is exposed to light, it is soluble in ether, but after the action of light, it becomes insoluble in that menstruum. When the layer of bitumen has dried, the negative is applied, and the whole exposed to the action of light for so long a time as experience may suggest. When the exposure is completed, the soluble portions of the bitumen are dissolved by ether, and removed from the surface of the stone, which is then made ready for the printer in the usual way. Similar results may be obtained by substituting for the ethereal solution of bitumen a mixture of bichromate of potash and gelatine, gum, or albumen; the action of light renders the mixture insoluble in water. After exposure, the stone is cleared of the soluble portions, and prepared for the printer in the usual manner. Zinc plate may be substituted for the stone.

PHOTOZINCOGRAPHY.—In this process a positive picture is obtained on paper, rendered sensitive by gelatine mixed with bichromate of potash. The picture, upon being taken from the printing-frame, is inked all over by a roller charged with lithographic ink, and then put into warm water. Those portions of the sensitive surface which remain unchanged by the action of the light, are dissolved out. The paper is next placed on the prepared zinc-plate, and passed through the printing-press, leaving behind it on the plate a complete transfer of the picture. After suitable preparation, the plate will yield any required number of printed impressions.

PLATINUM.—A greyish-white metal, very dense, infusible, malleable, and ductile. Like gold, it is unattacked by most chemical agents, and, like it also, is readily acted upon by *aqua regia*, yielding a reddish-brown crystalline salt—bichloride of platinum. Its density, when hammered or rolled, is 21·5. It is the heaviest body known. Platinum combines directly with oxygen only at a red heat, and under the influence of the caustic alkalies. Two oxides are known—the protoxide and the binoxide. The salts of platinum have been very little studied at present, as they possess but little interest.

Bichloride of platinum has been applied by M. Caranza and others as a substitute for chloride of gold in toning positive proofs; it is obtained in a similar manner to the latter salt.

POSITIVE.—The term *positive* in photography is applied to different products of the art. It is employed in contradistinction to the term *negative*, to designate a photographic image in which the light, shade, and position are identical with the object, while in the negative each of these features is reversed. As the action of light produces a darkening effect on the sensitive salts of silver, &c., it necessarily results that the image obtained must be reversed in light and shade. The pictures obtained in the camera obscura on the collodion film are *negatives* by transmitted light, and *positives* by reflected light. Positives by transmitted light may be obtained by application of a negative to a sensitised film. Positives are also obtained on paper rendered sensitive with chloride of silver by superposition of a transparent negative. It will thus be apparent that photographic positives are of three kinds: first, those obtained on the sensitive film in the camera obscura, when the image so obtained is viewed by reflected light; second, transparent positives obtained on the sensitive film by superposition of a transparent negative, as is seen in the stereoscopic pictures on glass; and third, positives on paper, sometimes called *proofs* or prints. These applications of the same word to products widely differing in their nature give rise to much confusion, and necessitate the using of a qualifying term, as *direct* positives, *transparent* positives, &c.

(*To be continued.*)

Critical Notices.

*Twelve Stereoscopic Views of the Interior of St. George's Chapel, Windsor.**

THE Royal Chapel of St. George, in Windsor Castle, is one of the most interesting architectural structures in England. Erected in the fifteenth century, by Edward IV., it exhibits a fine and pure example of the architecture of the time.

This series of views will be equally interesting to the antiquarian, artist, and general public. Few who have visited this noble chapel but would gladly obtain some memento of their visit, and nothing is so well calculated to renew the pleasing impressions received on the spot as the stereoscopic image. The views, which are exceedingly well taken, represent that portion of the "Choir" in which Divine service is performed, the lectern occupying the centre of the picture; next is a "General View of the Choir," with the organ gallery—an exceedingly brilliant and effective view, quite dioramic in its effects of contrasted light and shade; next we have views of the "South Side of the Choir," and the "North Side" of the same, exhibiting the large stained window over the altar; then there is the "Rutland Chapel" in the north aisle, with the monumental tomb of Sir George Manners, Lord Ross, and his wife, niece to Edward IV. A view in the "South Aisle" displays the tomb of the late Duchess of Gloucester, erected by command, and at the expense of, Her Majesty the Queen; a second view of the "South Aisle," looking east, displays another view of a portion of this tomb; "Beaufort Chapel," also in the south aisle, possesses very fine stereoscopic effect, the sculptured figures on the tomb being seen through the railings in front. The "Tomb of Edward IV.," attributed to Quentin Matsys, is a most curious and elegant work of art, which forms a truly exquisite picture. Another view represents the "West Window," so remarkable for its six compartments of stained glass, the details of which are admirably rendered. We regard this series of views as a truly valuable addition to the wealth of the Stereoscopic Treasury—one whose pictorial interest is second only to its historical.

Fourteen Stereoscopic Slides of the Relics of Sir John Franklin's Expedition, brought home in the "Fox," by Capt. M'Clintock. Photographed by Lieut. CHEYNE, R.N., at the United Service Museum, Whitehall.†

THIS interesting work has been appropriately undertaken by an officer, who, to use Lady Franklin's words, "has himself served, with great credit, in three Arctic expeditions." Upon the great and melancholy interest attached to these relics there can be no necessity for us to dwell. Perhaps "The Record" will be considered the most interesting among these slides; it is very neatly reduced from the original, and will be eagerly scanned by every one taking an interest in the subject. The nature of these "relics" must be well known to our readers.

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* London: Frederick Jones, 146, Oxford-street.

† Published by the artist, at 42, Duncan Terrace, Islington, N.

They consist of various articles found in the cairns, and in the boat with the skeletons. A view of the schooner, *Fox*, with a portrait of its commander, Sir Leopold M'Clintock, are included in the series, to which is added a photograph of Sir John Franklin, from the best engraved likeness. The national and historical interest attaching to these stereographs is so great, we are not surprised to learn that the labours of the artist are appreciated in the highest quarters. Her Majesty and the Prince Consort have both graciously acknowledged their appreciation of this most interesting box of stereographs.

A Catechism of Chemistry.

◆

HEAT—(*continued.*)

Q. What effect does heat produce on bodies?

A. All bodies, when heated, acquire an increase in bulk, and return to their original dimensions on cooling.

Q. Is this fact applied to any particular use?

A. The measure of this expansion by heat is universally employed as the measure of temperature.

Q. Is there any difference between *heat* and *temperature?*

A. Yes. In scientific language, the term *heat* is only applied to that power which excites in us the sensation of warmth.

Q. What, then, is understood by the word *temperature?*

A. *Temperature* means the energy with which heat is transferred from one body to another.

Q. How is temperature measured?

A. By the thermometer.

Q. It is stated above that all bodies expand by heat. Which class of bodies expands most—solids, liquids, or gases?

A. Solids expand least of all, on account of the amount of cohesion amongst their particles.

Q. Do solids expand uniformly?

A. As a rule they do, in all directions, and, on cooling, contract to their original shape. Very soft bodies, however, when frequently heated, are found to have undergone a permanent expansion in bulk. A lead pipe, for instance, which has been used for conveying steam, will be found to lengthen permanently some inches.

Q. Is the expansion of bodies equal for the same increase of temperature?

A. It is not. Each body has a different power of expansion for each increase of temperature.

Q. Give the amounts of expansion by heat of some of the more common solid substances.

A. For an increase of temperature, from the freezing point of water to the boiling point, a rod of English flint glass will expand 1 inch in 1,248; under the same circumstances, platinum will expand 1 in 1,131; palladium, 1 in 1,000; iron, 1 in 846; gold, 1 in 682; copper, 1 in 582; silver, 1 in 524; lead, 1 in 351; and zinc, 1 in 340.

Q. Do liquids expand more than solids in proportion to the increase of temperature?

A. Yes, considerably more. They also differ amongst themselves to a much greater extent than do solids.

Q. Give the amounts of expansion by heat of some of the more common liquids.

A. Between the freezing and boiling point of water, mercury expands 1 in 55; water, 1 in 21·3; and alcohol, 1 in 9.

Q. What rule does the expansion of gases by heat observe?

A. As the force of cohesion is entirely overcome in gases, there are no great variations in their expansion, as there are in the case of solids and liquids. It may, therefore, be stated, without sensible error, that all gases expand alike for equal increments of heat—1,000 parts of any gas, at the freezing point of water, becoming 1,366 parts at the boiling point.

Q. Explain the principle of the common thermometer.

A. The thermometer is an instrument for measuring degrees of temperature. Its value depends upon the fact, that the expansion of any substance—solid, liquid, or gaseous—is always proportionate to the heat employed; the same body always expanding to the same extent by the addition of the same amounts of heat.

Q. What kinds of thermometer are there?

A. A thermometer can be constructed so as to have its indications based upon the dilatation by heat of either a gas, a liquid, or a solid.

Q. What is the construction of a thermometer of the first class?

A. An *air thermometer* consists simply of a bulb of glass, communicating with a narrow hollow glass stem, dipping into some coloured liquid; a scale is attached to the long stem; and the differences of temperature are shown by the expansion or contraction of the air in the bulb causing the liquid to fall or rise in the stem. There are several objections to thermometers of this kind, the chief being their limited range, and also, that differences of atmospheric pressure were capable of influencing their indications in the same way as differences of temperature.

Q. What is the construction of liquid thermometers?

A. A liquid thermometer consists of a glass bulb, connected with a stem, and partially filled with liquid, so that the expansion or contraction of the liquid should be visible in the stem. Mercury is the liquid ordinarily used for this purpose; and the proportion between the size of the bulb and stem, and the quantity of mercury in the instrument, is usually so adjusted that, at a temperature of freezing, the summit of the column of mercury is as the lower part of the stem, near the bulb; and, at the boiling point of water, the column is near the upper point. Some mercurial thermometers are, however, constructed, so that the column shall rise in the stem, for temperatures, from the boiling point of water up to that of mercury; whilst others, which are only intended for ordinary atmospheric phenomena, merely range between the extreme temperatures experienced in our climate.

Q. How are thermometers graduated?

A. Two standard points are universally taken, as first suggested by Sir Isaac Newton, namely, the temperature of melting ice and that of boiling water. The thermometer is immersed first in melting ice, until the contraction of the mercury has ceased, and the point at which it then stands is marked. It is then immersed in water, which is kept boiling in a metallic vessel, until the point to which the mercury rises is again constant. A mark is made at that point, and then the space between the two divisions is subdivided into equal parts, according to the scale to which the thermometer is to be graduated.

Q. What scales are there in general use?

A. There are, unfortunately, three different thermometric scales in use in Europe; the Fahrenheit, in which the space between freezing and boiling is divided into 180 equal parts or degrees; the zero, or 0°, being 32 degrees below freezing. According to this scale, water freezes at 32° and boils at 212°. Most unfortunately, this barbarous system of thermometric measurement has obtained such footing in England, that the substitution for it of the beautiful centigrade scale seems almost hopeless, except in scientific books and experiments.

Q. How is the centigrade scale divided?

A. The freezing point of water is called zero, or 0°, whilst the boiling point is called 100°, the interval being subdivided into 100 equal parts or degrees. Temperatures below 0° are counted in the same way as those above 0°, the negative sign being prefixed to the lower temperatures. The centigrade is the scientific scale, and is also in common use in France.

Q. What other scale is there?

A. That of Réaumur, in which the same interval is divided into 80°, the zero being the freezing point of water. This scale is in use in Germany and Russia.

Q. How can degrees of one scale be converted into degrees of either of the other scales?

A. By the employment of the following formulæ:—

Fahrenheit to centigrade	$\frac{5}{9}(F^\circ - 32) = C^\circ$.
Centigrade to Fahrenheit	$\frac{9}{5}C^\circ + 32 = F^\circ$.
Réaumur to Fahrenheit	$\frac{9}{4}R^\circ + 32 = F^\circ$.
Fahrenheit to Réaumur	$\frac{4}{9}(F^\circ - 32) = R^\circ$.

Q. According to these formulæ, how would you proceed to find the centigrade equivalent for 50°?

A. $50^\circ - 32^\circ = 18^\circ$ and $\frac{5}{9}$ of $18^\circ = 10^\circ$, which is the degree on the centigrade scale corresponding to 50° F. In simple language, the rule is, therefore, to subtract 32 from the Fahr. degree, and then multiply by 5 and divide by 9. The other degrees are converted in a similar manner.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 30*th July*, 1860.

You will be glad to hear that the Abbé Moigno, who has done so much for photography and optics, has just had conferred upon him the title of honorary member of the *Société Hollandaise des Sciences* at Harlem. This venerable society is now more than a century old; its honorary members are chosen among the great *savants* of the world.

M. Poitevin has been again experimenting upon chloride of iron as a photographic agent. Under certain circumstances, perchloride of iron is reduced by light to the state of protochloride. M. Poitevin takes 100 parts by weight of water, and dissolves in it 10 parts of perchloride of iron, and 3 parts of tartaric acid. The paper is immersed into this solution, and, when dry, placed under the negative to receive its image. After exposure, it is washed. The protochloride formed where the light has acted is dissolved; whilst the perchloride, not acted upon, is partially or totally decomposed, leaving in the paper a certain amount of oxide of iron. The paper is then passed into a solution of gallic or tannic acid, when these latter portions become inky black. Wherever reduction has taken place the paper remains perfectly white, forming the lights of the proof.

M. Phemier recommends the following composition for a sensitising bath:—Dissolve 12 grammes of nitrate of silver in 100 grammes of distilled water, and add, drop by drop, to this solution, liquid ammonia, taking care to stir the solution well, and until the brown tint which arises is replaced by perfect limpidity. It is afterwards good to boil this solution for some minutes to bring it to a neutral state.

M. Chevreul, member of the Institute, has just read before the Academy of Sciences a note upon the new colouring matter. fuchsin, obtained from aniline, and which I have once before mentioned in my letters. According to M. Chevreul, no colouring matter yet known can be compared with fuchsin for the brilliancy, intensity, and purity of its tints. It furnishes a violet, and a red-violet on silk. Before fuchsin was known, carthamin gave the finest rose colours, but its rose-tints were less violet than those of fuchsin. The cochenille rose tints are still inferior to those produced by carthamin. "But," says M. Chevreul, "if fuchsin has the brilliancy of the rose herself, it has also her evanescence."

Four hours' exposure to the sun are sufficient to modify the tint of silk dyed with fuchsin, changing it to a wine colour, after which it passes to red. On cotton its stability is no greater.

M. Chevreul concludes his paper by some remarks on the action of luminous air upon dyed stuffs. In 1837 he showed that in most cases stuffs dyed with organic colouring matters were discoloured by exposure to the light of the sun, and that oxygen was active in this change was proved by showing that the same stuffs kept their colour for years in a luminous vacuum.

On the contrary, prussian blue is discoloured in the luminous vacuum, and becomes first of all white, then of a brown, earthy hue, after which it may be brought back to blue by admitting the air.

But some very curious results have been obtained with a substance called *picric acid*, which has been used for about twenty years as a yellow dye.

A piece of silk and a piece of woollen cloth having been dyed yellow with picric acid, and then exposed to the air and the light of the sun for some eight months, it was found that in these eight months the woollen cloth had gained two tints, that is to say, that it had become two tints darker; the silk stuff gained four tints in the first three months, after which it constantly lost colour.

In the year 1836, Baron Liebig and Professor Pelouze found in wine oil a peculiar ether which they termed œnanthic ether, and to which they attributed the *bouquet* of wines. The formula $C_{14}H_{23}O_2,HO$ was given to the œnanthic acid existing in this ether. These results were confirmed by some experiments by M. Mulder, whilst M. Delffs insisted that œnanthic acid was identical with pelargonic acid $C_{18}H_{18}O_4$.

Now, M. Fisher has just shown that œnanthic acid does not exist, but that what has been taken for it is a mixture of *caprylic* and *capric* acids.

Dr. F. L. Phipson has communicated to the Academy a note upon the existence of *aniline* in certain *fungi* belonging to the genus *Boletus*. When certain of these *Boleti*, such as *B. cyanescens*, &c., are cut with a knife, the interior of their tissue becomes suddenly of an indigo blue. In other species the coloration is somewhat different. M. Phipson shows that the colourless colouring matter employed by nature in these fungi is aniline, the alkaloid which is obtained by the action of potash upon indigo, and which is also found in gas-tar, but which was never before met with in nature.

M. Scriba writes upon a characteristic property of bloodstains. M. Teichmann has shown us that red blood gives with acetic acid small microscopical red crystals, which have been called crystals of *hemin*, to distinguish them from the crystals of *hematoïdin* observed in blood, which has been abandoned to itself. The crystals of hemin are rhomboidal, and can be produced with certainty; also in medico-legal researches they are obtained with only slight traces of blood. To this effect, the spotted or stained tissue is introduced into a test-tube and boiled with glacial acetic acid; a few drops of the solution are then taken and evaporated in a watch-glass at 40° to 60° (centigrade), and the residue examined under the microscope. Ordinary acetic acid will do in most cases; the author, however, gives the preference to glacial or monohydrated acid.

According to M. Merck, these crystals of hemin contain 85 per cent. of organic matter, 15 per cent. of sesquioxide of iron, and a certain proportion of alkaline chlorides. M. Scriba thinks that they result from the union of the hematin of the blood with the acetic acid, for he has obtained the same crystals by treating with glacial acetic acid and a little common salt, some hematin perfectly exempt from any globulin, fibrin, and serum. But the crystals in question cannot be produced with hematin that has lost its iron by sulphuric acid.

All species of red blood give rise to crystals of hemin with acetic acid, so that it is not possible by this means to distinguish man's blood from that of other animals.

Miscellaneous.

Gauss's Lens.—M. Steinheil announces that he has at length completed the famous objective proposed and calculated by Gauss, but of which the realisation had been declared doubtful. It is well known that Gauss wished to combine the extreme rays with the central rays (which coincide with the axis of the pencil), while achromatic objectives usually combine only the middle rays with those of the axis or the edges. The objective constructed by M. Steinheil has a diameter of 36 lines and a focus of 46 inches. In achromatism and sharpness of image, it surpasses the best of Fraunhofer's, while the field of vision is as extended as in his. The primary colours and spherical aberration are entirely suppressed. This object will bear a magnifying of 300. M. Steinheil has begun another objective on Gauss's formula, which will have a diameter of 54 lines and a focus of 48 inches; if he succeeds as well with this as with the first, M. Steinheil thinks that the science of dioptrics will have advanced a step.

Origin of Solar Light.—Maurice Hess, of Bonn, believes that he explains both the origin of the light of the sun, and the various phenomena observable on the face of this luminary, by supposing that it is in a state of incandescent fusion. The surface of this matter in ebullition forms a thin, igneous crust, pierced in every direction, and constantly upheaved by the fire beneath. This crust, due to the radiation of heat in space, will be enveloped by an atmosphere non-luminous of itself, but which becomes so by contact with the central fire in the immense fissures and craters through which the incandescent matter finds vent. According to this theory, the spots on the sun will be due to cooling of portions of the igneous crust, caused by interruptions in the volcanic action, and always in the vicinity of the great upheavings or eruptions which produce the faculæ. The luminous holes and fissures perceptible in the centre of these spots, will be partial eruptions in cooled portions of the solid crust. Where these flaws are most numerous and smallest in extent, there we shall see penumbra. All these phenomena may experience sudden and rapid changes, in consequence of the continual displacements due to volcanic action. The red flames apparent on the edge of the sun during a total eclipse are, according to M. Hess, only the unequal surface covered with portions of matter in a state of fusion, and the protuberances are incandescent cones, which form the sides of immeasurably deep volcanoes. The principal objections that can be made to M. Hess's theory seem to be—first, the upward motion of the protuberances; second, the period of eleven years at which the solar spots reappear.

Photographic Notes and Queries.

PHOTOGRAPHIC PUBLICATIONS.

Sir,—I would suggest, through the medium of your valuable journal, that some steps be taken to secure a periodical register of new photographs, both stereoscopic and others, in the same manner as the publication of new books is recorded in the *Athenæum*, the *Publishers' Circular*, &c. At the present time, it is scarcely possible to ascertain what photographs are for sale, except by personally visiting the various dealers. It is true, a good detailed catalogue is published by Messrs. Gaudin, Frerès, of the stereoscopic pictures they have for sale, and if their example was followed by other wholesale houses, the difficulty I complain of would, in a great measure, be obviated. At the present moment I am in quest of several hundred views of certain localities, and the difficulties I encounter in my task are very discouraging. What I have to suggest is, that photographers should send to the "Photographic News" a list of the views, &c., they bring out, together with size, price, and publisher's name, for which you might appropriate a small space in your columns weekly. I think, if this plan were adopted, the business of photography might be considerably extended, with great advantage both to artists and the public.—Yours, &c., Paternoster.

DRY COLLODION.

Sir,—It would be a great point settled if we could but arrive at a correct theory of dry collodion—why it is less sensitive to the action of light, and other conditions in which it differs from wet collodion. I do not think that Mr. Seely's explanation is quite satisfactory in attributing the diminished sensitiveness to the absence of organic matter; for collodion, albumen, and paper, are organic matters, which are supposed to act more or less in accelerating the production of the image. Then again, the daguerreotype picture is received upon iodide of silver, pure and simple, without the presence of any organic matter at all, yet that iodide is found sufficiently sensitive, and is easily rendered more so by the addition, not of organic matter, but of *bromine*. Now, if the iodide of silver is sufficiently sensitive in one case, why not in another? The Abbé Despratz, who has warmly advocated the claims of dry collodion, has investigated the causes of its deficient sensitiveness, and attributes it to the isolation of the particles of iodide of silver, caused by the contraction of the collodion in drying; and to remedy this defect, he proposed the addition of rosin to the collodion. The advantages of this addition, I am prepared to say, are quite satisfactory, with a suitable collodion; and the time of exposure in excess of that required by wet collodion is very trifling, and of no account for out-of-door photography. It is not improbable that a more efficacious agent even than rosin may be found; and if the nature and object of the addition required be kept in view, complication of the subject will be avoided. I have no doubt as many "dry collodion" processes as "preservative" processes may be proposed, all agreeing, probably, in their nature and action; but let us be satisfied with one, of its capabilities and deficiencies, before we rush blindly to others.—Yours, &c. S. J. R.

IMMORAL PHOTOGRAPHS.

Sir,—If I am not mistaken, an act was passed not long ago for the suppression of immoral publications, &c. If so, let me ask why stereographs of an indecent character are suffered to be openly exposed in the shop windows, so that a man who takes a walk with his wife and daughters dare not venture to look at the windows of many of our photographic publishers? It is time that the public press interfered to check this growing evil.—Yours,

A Londoner.

TO CORRESPONDENTS.

Ricardo.—Your bath probably becomes too weak: add fresh nitrate of silver. If you put nothing in to deteriorate it, we do not see any other cause of failure from that source. Possibly an excess of ether and alcohol may be the source of annoyance; in that case, put the bath into a clean glass bottle, and place it where it can become heated and kept hot for a few hours, to drive off the ether, &c. You can easily recover the silver from the old baths, or treat them as recommended above. We have no reliable information of the state of practical photography in Sweden; the difficulties of working there in winter are not greater than those experienced in North America, where beautiful pictures of scenes in the woods, &c., have been taken when the landscape was covered with snow. The "Photographic News" can be sent to you in Sweden. The terms of subscription will be 17s. 4d. for one year, including postage. The protonitrate of iron developer described in No. 92 is complete in itself, and preferable to the other.

Helios.—Photography is both a science and an art: a science, inasmuch as it embodies certain principles of physics and chemistry, which, when applied, constitute the art of photography. From this definition, it becomes evident that a practical photographer may work, but empirically, without any real knowledge of the principles; while the man of science may be well versed in the science of photography, without ever taking a picture. There is the same difference between the two as between the architect who conceives the design of an edifice, and the builder who constructs it in obedience to that design.

X. Y. Z.—If you peruse Messrs. Davanne and Girard's articles on "fixing," you will perceive that no advantage accrues from washing the positives in salt and water. The object of the alkaline toning-bath is to neutralise the free nitric acid in the proof. A 40-grain solution is not too strong. We sometimes use a 60-grain. You must be sure that the strength is maintained, by filling up with a *stronger* solution.

T.—Suppose the sitter within the house, place a white screen on his right, which will give sufficient reflected light on that side; the left will be sufficiently illuminated by the direct light passing through the window. If the light be found insufficient, add more white screens overhead and in front of the camera. It would be economy to sell your leaden cistern and buy one of slate, besides being much safer in a sanitary point of view.

H.—The sulphur toning can be conducted in full daylight. Subsequent immersion in acidulated water applies only to gold-toned proofs. The time occupied in sulphur toning depends greatly on the temperature of the bath; if that be warm, the toning is quick, and *vice versâ*. The Soehnée varnish, advertised in our columns, is that usually preferred.

Fred. Lee.—It would appear as if some reflected light was cast upon the lens, and thus weakened the image. Try the effect of a temporary cone to cut off the incidental light. But the weakness may arise from imperfect focussing: you may have to allow for the chemical focus. The blue spots appear to be due to impurities in the substance of the paper.

Negative.—The varnish will answer for proofs of any size. The quantity of turpentine or camphine, which is preferable, will depend upon the purity and consistency of the balsam—about one-fourth to one-half, so that it will flow freely from the brush upon application. The proof will require to be first coated with a solution of gelatine, to prevent absorption of the varnish.

Georgius.—Any opaque pigment ground up in gum-water, applied after the proof is varnished; or try the method described in the article on colour, in No. 99 of the "Photographic News." If you do not require to print many negatives, a coating of diluted albumen will answer for a varnish. Varnishes applied without heat seldom adhere properly.

Vigo, St.—These so-called new processes are but a ringing of changes upon the old ones: the principle is the same in each, and it is to principles alone you should give attention, when estimating the value of a so-called new formula. It is an alkali that is recommended: soda is preferred; and it makes little or no difference whether it be carbonate, borate, or phosphate.

Alec.—You can recover your silver by evaporating the solutions to dryness, and fusing them with cyanide of potassium, as described in a previous number of this journal. Or by immersing slips of copper in the nitrate solution, the silver will be precipitated in a metallic state.

Goldfun.—If acid is brought into contact with the solution of hypo., the latter will be decomposed, and sulphur liberated. With this fact in view, where can be the policy of adding acid to sensitising or toning baths? You may get a better colour, but at what risk!

Geo. Rowe (Georgetown).—The process is very simple. You obtain a positive on paper prepared with bichromate of potash and gelatine; this is transferred, after inking in the manner described, to a prepared zinc plate or lithographic stone; then proceed as in the ordinary lithographic process.

J. N. S.—1. M. Bertsch's automatic camera will meet your views, probably, on the subject of out-of-door photography. 2. We cannot explain the reason why so large a quantity of acetic acid is required, except that it has been found advantageous in practice.

Diddler.—A little convergence will probably be necessary: the amount you can estimate by the place occupied by the images on the focussing-screen. A very little ingenuity will suffice to enable you to make the camera backs.

T. Barton.—Paint your background of a leaden hue. By inclining the screen backwards or forwards, you can obtain various tones of grey, according as it reflects more or less light.

Stereo.—You doubtless mean the monostereoscope, invented by M. Claudet. We do not know where it is kept for sale. The telestereoscope is only an extension of Mr. Wheatstone's reflecting stereoscope.

J. C. B.—It is economy to keep your fixing and toning baths covered up from the action of light. You need not operate in a dark room, if you take the above precaution.

Eland.—It is very probable that your albumenised paper has become deteriorated by long exposure to the atmosphere. The black spots on it appear to be sulphide of silver.

⁂ All editorial communications should be addressed to Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard, London, E.C.

THE PHOTOGRAPHIC NEWS.

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COLOUR IN ITS RELATION TO PHOTOGRAPHY.*

BY CHARLES MARTEL.

The photographer who desires to have a clear comprehension of colours, should supply himself with a prism of flint glass, and carefully examine and study the optical properties of the spectrum formed by a solar ray passing through it.

The spectrum should be received on a large sheet of white paper. Commencing at the bottom, the order of the colours will be *red*, which gradually passes from pure red into a compound colour by admixture with yellow, forming *orange;* proceeding upwards, the quantity of red in the orange diminishes, until we reach pure *yellow;* next, the yellow is found slightly tinged with blue, and this latter colour increases in quantity, and forms the secondary colour, *green;* continuing upwards, the green becomes bluer and bluer, until we reach pure *blue;* passing beyond this point, we find the blue to become tinged with red, forming *violet*, which from this point becomes redder and redder, as we approach the red from whence we started. As, in the present instance, our remarks are limited to the optical properties of colours, it will not be necessary to touch upon the invisible rays of the spectrum, which, although invisible to the eye, are capable of producing a decided photogenic result, since these rays possess considerable chemical influence on the sensitive surface of the salts of silver.

The colours forming the spectrum are pure prismatic hues, and are taken as the types of colours: they are definite, well-determined colours, inasmuch as not being formed by material bodies (pigments), they suffer no impurity by their admixture with each other *in pairs:* thus, the blue may mix in any proportion with the red, and various hues of red will result, but the mixture is still a pure colour; in like manner, the blue may mix in varying proportions with yellow, and various hues of green will result, but all pure colours. It is only when a third primary is mixed with the other two, that an impure colour is produced: these impure colours are termed *greys*, and are designated by the name of the primary or secondary in excess. Thus, we have various blue greys, green greys, red greys, orange greys, and yellow greys (browns), and violet greys.

The most superficial examination of the colours of objects will show that they are, for the most part, greys. The pure colours are, in temperate climes at least, very sparingly distributed; they occur chiefly among flowers and insects. They are met with in their greatest brilliancy and intensity in the tropical regions, by which we may infer that the development of pure colour is due to the intensity of the sun's rays.

By classifying the greys in the manner indicated above, in referring them to the primary or secondary colour in excess, we have a ready means of analysing the colours of bodies. We must look for the predominating colour present in a coloured body, and designate it accordingly. M. Chevreul has constructed a scale of 72 hues of pure colours, primary and secondary; this number is arbitrary, but convenient. It may be extended indefinitely, by substituting in another scale secondary colours in the places occupied by the primaries; in the first, we can produce a series of 72 greys, arbitrary in number like the others, and like them, also, capable of indefinite extension.

Now, in painting, this recognition of the prevailing colour in an object is of great importance, as without it the painter's efforts in colouring are vague, confused, and uncertain. This is proved in a most striking manner in the practice of young artists engaged in copying the works of the old masters, in the British Institution, the Louvre, &c. Nothing can be more absurd than the blind attempts of these embryo painters to imitate the subtle hues of the originals. In a very short time their palettes become covered with a mass of pigment resembling nothing so much as mud in colour. By mixing empirically various reds, blues, and yellows, themselves impure in colour, not a particle of pure colour is left to leaven the mass of innumerable indefinable broken colours. This result may be avoided by bearing in mind the following principles:—That if we wish to obtain a pure *green*, the result may be secured more certainly by selecting a yellow tinged with blue, and a blue tinged with yellow, than if we took an orange-yellow and a violet-blue, because in the latter the presence of red would tarnish the purity of the green and render it duller, and if it were increased the compound would at length become green-grey; the result being the same as if we added black to the pure colours.

Regarding the photographic image as a picture in grey or monochromous colour, in proceeding to colour it, we may content ourselves with applying thin washes of local colour until the colouring is completed. But this style of colour, although the most artistic in virtue of its truthfulness, will not be so much admired as that in which opaque body colours are applied, which produce their effect by veiling or concealing the photograph altogether. In such cases the photograph plays the part of the *dead-colouring* in oil painting, and the pictures require to be treated by a master-hand, in order to preserve their integrity. Again, two systems of colouring present themselves with regard to contrast and harmony, namely, the harmony of analogy, and the harmony of contrast, of colours.

In the *harmony of analogous colours* we may employ, 1, different tones of a single scale, more or less approximating, forming a harmony of scale; or 2, tones of the same, or nearly the same, intensity belonging to scales more or less approximating, constituting a harmony of hues; and 3, the harmony of a dominant-coloured light, in which the different colours are arranged according to the law of contrast, but with one of the colours predominating, as if they were seen through a glass faintly tinged with that predominating colour.

In the *harmonies of contrast* we have—1, a harmony of contrast of scale, arising from two distinct tones of the same scale of colour; 2, harmony of contrast of hues, arising from tones of different intensity, each belonging to contiguous scales; 3, harmony of contrast of colours, arising from the simultaneous view of colours belonging to widely different scales, assorted conformably to the law of contrast.

In the harmony of contrast, the complementary assortment is superior to every other; the tones must, however, be taken of nearly equal intensity.

The choice of these systems will depend mainly upon the object the artist has in view, and its suitability and appropriateness to the subject to be coloured.

If great brilliancy and splendour are desired, we resort to the contrast produced by complementary colours. By a knowledge of the law of contrast, this aim will be successfully attained with inferior colours, while it may fail with the most brilliant, in the hands of one ignorant of the law.

That brilliant colours are unnecessary to produce the finest effects in painting, may be proved by the works of the greatest painter of religious subjects in modern times, Ary Scheffer, whose pictures are mostly painted on the system of harmony of analogy: consisting principally of cool greys and browns, with scarcely a particle of pure colour; yet the want of pure and brilliant colours is never felt in viewing these works, as they are so full of deep thought, that the spectator is concerned more with the subject of the picture than with the sensuous element by which that thought is expressed. We think that the photographic artist should, in his first essays in colouring, give the preference to the system of harmony of analogy. Taking blue, for example, as the centre of his operations, he has the whole range of hues into which blue enters, including its compounds with yellow, on the one hand, and with red on the other, and also their innumerable tones. In this example neither yellow nor red must be allowed to predominate over the blue, else the harmony of analogy will be lost. The range of analogous hues may be exhibited in the following manner:—

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* Continued from vol. iv. p. 158.

Red. 10, 9, 8, 7, 6, 5, 4, 3, 2, 1. BLUE. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10: *Yellow*,

in which the blue unites with increasing quantities of *red*, on the one hand, producing various hues of violet, but still remaining blue, in consequence of that colour predominating; and, on the other hand, the blue unites with increasing quantities of *yellow*, producing various hues of green, but still remaining blue, in consequence of the predominance of that colour. By adopting this system, the artist will gain a great mastery over the materials of his art, and attain to greater certainty of results.

(*To be continued.*)

GENERAL OBSERVATIONS ON PHOTOGRAPHIC POSITIVES.*

BY MM. DAVANNE AND GIRARD.

We have shown by our preceding studies that, among the various fixing agents which may be employed in photography, the best is hyposulphite of soda; we cannot, however, assert that it is good absolutely, for in our last essay we enumerated various causes which may bring about its decomposition, and consequently destroy the proofs.

These causes of decomposition are:—

1. The action of light, direct solar, or diffused.
2. The presence of nitric acid in the printed proof.
3. The total saturation of the hyposulphite of soda by the salts of silver.
4. The local or accidental saturation resulting from interposed bubbles of air, from the proofs sticking together, from being partially immersed, and from the solution of hypo. being too weak.
5. The presence of free sulphur or thionic compounds, caused by anterior decomposition.
6. The voluntary or accidental addition of any acid.

Therefore, in practice, we must protect ourselves as much as possible from these causes of alteration; and we shall now examine the rational conditions of good fixing from the moment of taking the proof out of the printing-frame, remarking that hitherto we have only considered the subject of toning.

I. *Modifications the Proof must be submitted to before fixing.*—Our first care must be to remove the black solarised margins from the proofs, or, what is better, avoid them by covering up the margins of the sensitised paper in the printing-frame with a border of black or yellow paper to admit the negative. We thus prevent the solarised margins from acting upon the successive baths wastefully, especially on the toning-bath, which they influence more than all the rest of the proof.

The proof, on removal from the printing-frame, contains, on the one hand, chloride of silver, metallic silver, and a combination of silver with organic matter: these three compounds are insoluble, and have no direct action upon the hyposulphite of soda. On the other hand, it contains nitrate of silver and free nitric acid, the action of which on the hypo. is immediate; it is easy to remove these two latter bodies, or render them inoffensive. It is only necessary to wash the proofs first in plain water, and then in a bath composed of—

Bicarbonate of soda ...	1 part	(1 drachm).
Chloride of soda ...	5 parts	(5 drachms).
Water	100 parts	(12½ ounces).

The reaction upon the soluble compounds takes place immediately the nitrate of silver is transformed into chloride of silver, and the nitric acid into nitrate of soda. We may employ simply a solution of bicarbonate of soda in water, then the nitrate of silver will be transformed into the insoluble carbonate, and the nitric acid be neutralised as before; but, especially if the preliminary washing be omitted, in that case we must increase the dose of the alkaline bicarbonate, which may act upon the sizing of the paper; therefore we prefer to employ it weak, and mixed with an excess of chloride of sodium.*

The preliminary washing in pure water will secure the same weight of hyposulphite of soda, fixing double the number of proofs, but if it be found that this washing complicates the operation, it may be omitted, and the proof be passed immediately into the solution of bicarbonate of soda and salt; the silver passing thus from the soluble into the insoluble state, will have no other injurious action on the hypo.-bath than that of saturating it more rapidly.

II. *Concentration of the Bath of Hyposulphite of Soda.*—We know theoretically that the solution of hyposulphite of soda must be concentrated: it is necessary that it should act rapidly, and that the hyposulphite of silver be dissolved immediately it is formed in the substance of the paper. Our experiments were made upon solutions of 5, 10, 15, and 20 per cent.; this last strength appeared to give the best results, and we stopped at it, although there was nothing absolute in it; it is a medium strength, and may be diminished or augmented without any inconvenience. This solution is filtered into a dish large enough for the proof to float in it freely without touching the edges; the quantity of solution must be proportionate to the number of proofs; in any case they must float freely.

The fixing should be carried on in a room lighted through yellow glass, so that a very feeble diffused light falls upon the dish. The proof, on its removal from the solution of bicarbonate of soda, must be immediately immersed in the hypo.-bath, carefully avoiding the formation of air-bubbles, adherence to the sides of the dish, and every cause that will prevent the hypo. from coming in contact with both sides of the proof.

Several proofs at a time may be put into the hypo.-bath, but it is preferable to put in as few as possible, to avoid local saturation of the hyposulphite of soda, and the colour of the proofs will be fresher. It will be best to put only two, back to back, that will not prevent quick working, as each sheet remains but a short time in the bath.

III. *Time of Fixing, and its Influence.*—In every experiment we have made, we have found that after an immersion in the hypo.-bath of ten minutes, the proofs obtained in the ordinary way, even without previous washing in pure water, were completely fixed; it is, therefore, only in exceptional cases, as in employing excessively thick paper, of concentrated baths of soluble chloride, or of nitrate of silver, that we must consider how long it will be advisable to prolong the fixing, which, as observed by M. Legray, should be as brief as possible. Too long a stay in the bath of hypo. will have a twofold injurious effect on the proof: first, in destroying its vigour, by partially removing the half-tones, and if it must be toned after fixing, will render this toning, if not impossible, at least very difficult, and less good. If the proof be too strongly printed, it must not be reduced by a prolonged immersion in the hypo.-bath, but some other means, either before or after the fixing, must be employed.*

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* Continued from vol. iv. p. 160.

* We have satisfied ourselves, by direct experiment, that if nitrate of silver be added to a mixture of chloride of sodium and bicarbonate of soda, the precipitate formed consists almost exclusively of chloride and of a minimum proportion of carbonate of silver.

(*To be continued.*)

DRY COLLODION.

BY M. A. GAUDIN.

ON THE PREPARATION OF DRY COLLODION.

The preparation of dry collodion has made no notable progress for some time past; yet it is not for want of experiments and suggestions. The collodion has been submitted to every possible kind of treatment, from honey, through the whole range of sweetened liquors and syrups, down to albumen, gelatine, and dextrine, together with manipulations as impracticable as fastidious; yet none accomplish the aim proposed.

Washing the albumen film has always proved successful. Why is it not the same with collodion? Let us see in what the difficulty consists.

Between sensitised albumen and collodion there exists considerable difference of molecular texture. Albumen is a substance permeable by water, while collodion—a kind of fat body, soluble in alcohol and ether—refuses to become penetrated or softened by water. In the fresh state, these two substances have a great analogy of texture: they are both spongy; by desiccation, these pores become closed, and they attain a kind of vitreous state; but there is this difference between albumen and collodion when passed through the nitrate bath—the silver iodide is disseminated through the layer of albumen, while it lies only on the surface of the collodion film.

In consequence of this difference, the sensitive element resists a much greater amount of washing in albumen than in collodion: nothing can remove the sensitive portion embedded in the spongy body, while in the collodion it is only a superficial film, or layer of iodide; but by operating cautiously, collodion, on the contrary, better resists a washing calculated to remove the excess of iodide of silver, the sensitive layer being completely superficial, and the collodion itself repulsing the aqueous element.

When operating with collodion, we expose the plate as soon as possible after removal from the silver bath. Why so? Because the silver solution, becoming concentrated by evaporation, dissolves the sensitive film composed of iodide of silver, and not because the sensibility is greater at the time of removal from the bath. The liquid coating, in drying unequally, reacts unequally also on the sensitive film, and produces stains; but, in fact, the presence of the silver solution *is entirely useless during exposure:* it is injurious. I have proved, by direct experiments, that upon a collodioned-plate, from one half of which the nitrate was washed off, while on the other it was allowed to remain, the proof gave no indication that this artifice had been employed.

The solution of the problem, whether it is best to operate upon dry or wet collodion, consists, therefore, in an easy method of radically depriving the plate of the nitrate of silver. With wet collodion, it is sufficient to soak the sensitised plates in a large vessel of water; in this way the nitrate of silver will become so diluted, that the total evaporation of the water will produce scarcely any inequality on the proofs; but for dry collodion to keep a long time, the silver salt must be thoroughly removed.

Thus: a collodioned plate, sensitised and put to soak for a long time in a vessel of water, is always ready for use, without any loss of sensibility, and requires no longer exposure; but with dry collodion, every element of reaction must be removed.

The means of accomplishing this are very simple. It will suffice, after washing the plate in plenty of water on its removal from the silver bath, to put it to digest, not in ordinary water, but in water containing *a very minute dose of an alkaline iodide or chloride.* In proceeding in this manner, the nitrate of silver will be completely decomposed, and a corresponding quantity of chloride or iodide of silver will be formed upon the primitive sensitive coating, and make part of it. After another washing in plenty of water, followed by a last washing in distilled water, the plates may be put to dry in a suitable place sheltered from dust and light.

It is certain that dry collodion is less sensitive to light than wet collodion; but, on the other hand, it has been observed that the proofs obtained on dry collodion are of excellent quality, while it possesses the advantage of being worked away from the operating-room; the dry plates may be carried to the required spot, exposed in the camera, and developed when and where convenient.

If the presence of the nitrate of silver solution is unnecessary in the exposure, on the other hand, it is indispensable in developing the picture, and that is the reason why, before pouring on the developing solution, we must put the plate in the same condition as when it is taken out of the nitrate bath; that is, it must first be immersed in water, and then in the silver bath, just as if the plate had not been sensitised.

For sensitised collodioned plates, which are put to soak in salted or iodised water, it will be best to employ troughs into which frames with oblique grooves can be immersed, so that the plates can be placed downwards instead of upwards, and that in removing them from the trough the whole series can be taken at once and put into fresh water.

SCIENTIFIC GOSSIP.

Details respecting the photographic experiments which were made on the occasion of the recent eclipse are gradually coming to hand, although not with such minuteness and accuracy as we should desire to have them. Several most interesting facts (to photographers) are not mentioned at all, and others are only alluded to casually, as of no importance. The kind of photographic process employed is not mentioned, and we are left almost in the dark as to the times of exposure which were required during the short space of total obscuration. We have before us a few particulars respecting M. Foucault's attempts to obtain photographs of the corona and protuberances, but they are only given in general terms, and with no attempt at minuteness of detail. Possibly this may be explained by the fact that, in the hurry and bustle necessarily attendant upon photographic operations at such an exciting and critical moment, the dark slide containing the prepared plates got sundry knocks and displacements, which resulted in the appearance, upon developing, of six eclipsed suns instead of three—the images, consequently, interfering somewhat with each other. Three plates, as mentioned above, were exposed: the first, immediately after the commencement of totality, was exposed ten seconds, the next plate was exposed twenty seconds, and the third, sixty seconds. The wet collodion process was used; but we learn with surprise, and some horror, that immediately after their removal from the dark slide, the plates were treated with sulphate of iron and cyanide of potassium, with the view to obtain *direct positives!* Such a thing as this, we trust, is an unfounded report. When we bear in mind the enormous advantages possessed by negatives over positives, especially on such an unique occasion as the present—their capability of almost infinite multiplication on paper, with but a nominal loss of sharpness; the power which there is of printing from them on glass, and thus obtaining transparent positives rivalling the original in sharpness and delicacy—we can scarcely imagine that any photographer would be mad enough to deliberately throw away these valuable qualities for the sake of obtaining one or two glass positives—productions which possess all the imperfections of the exploded daguerreotype process, without its good qualities of delicacy and permanency. It was noticed in those pictures which had a progressively-increasing exposure, that the extent of corona was in proportion to the time occupied in its impression; it diminishes in intensity uniformly from the edge of the moon, until lost in the tint of the sky. No particulars are given respecting the size of the solar image which was produced by the apparatus; the latter was simply an ordinary camera, provided with a double lens of large aperture and short focus, mounted equatorially. In our opinion, it would have been impossible to have devised an instrument more fitted to fulfil the object contemplated. The phenomena seen during total obscuration are just such as require a tolerable-sized photographic representation to render them of any value, and the apparatus chosen would only give an extremely diminutive picture of the phenomena. We certainly had a right to expect that France, possessing, as she does, such accomplished mechanicians, astronomers, and photographers, would have taken care to obtain—for the benefit of both present and future men of science—a better record of one of the grandest and most sublime spectacles ever witnessed by human eyes. M. Le Pere Secchi, the Roman astronomer, was fortunate enough to obtain five separate photographic impressions during totality. The appearances of them confirm what was observed by the eye. The light of the red protuberances was so vivid, that it impressed itself almost instantly; the corona, however, required thirty seconds to be copied of any size, shorter exposures only giving it as a narrow ring. Some very interesting particulars are given by M. Petit, the Director of the Observatory at Toulouse. He states that the protuberances were on this occasion enormous, and of such shapes as to convince him that they were immense clouds floating in the vast atmosphere of the sun. Two of them were at least 20,000 leagues wide and 80,000 leagues high; a considerable portion was overhanging the solar disc, separated from it by at least 6,000 leagues—a circumstance which shows incontestably that they are not mountains.

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* The very weak solution of iodised cyanide of potassium, proposed by M. Humbard de Molard, yields excellent results. We can also employ a weak solution of cyanide of potassium, of hypochloride of lime, or a concentrated solution of chloride of sodium.

A patent has recently been taken out by Mr. Smith, of Pownall-road, Dalston, for improvements in transferring designs, and in ornamenting glass and other substances; also, in the manufacture of slides for magic lanterns. In transferring designs according to this invention, the patentee takes a print, either coloured or otherwise, or a design or otherwise, produced on paper or other similar material, and coats the surface thereof with collodion. When the collodion is set and hard, he washes off the paper or material on which the design was originally printed or produced, and the ink or colour will then be found firmly attached to the film of collodion. In ornamenting glass and other surfaces, he lays the film of collodion, to which a design has been transferred as above described, together with varnish or cement, on a sheet of glass, or on the surface to be ornamented, to which, on drying, it will firmly adhere. When the film of collodion to which the design has been transferred is to be employed as a slide for a magic lantern, it may either be mounted on glass or between two glasses, or it may be mounted alone in a suitable frame. This will possibly be found an excellent process for transferring positives printed on paper to glass or other substance. We cannot tell, without trying the experiment, what would be the effect of coating the surface of a paper positive with collodion; but, from the similarity of paper photographs and ordinary prints in printing-ink, each being formed by the adhesion of dark colouring-matter to the upper surface of the paper, we should imagine that there would be no difficulty in so transferring photographic prints. The advantages of any process of this kind are obvious. How frequently it happens that a valued print is disfigured by markings or dirt on the other side, which, showing through the paper, will destroy the beauty of the picture! This process renders it comparatively easy to remove the picture from the paper, and then to remount it on a clean sheet of paper or cardboard.

ON IODIDE OF SILVER.

BY DR. J. SCHNAUSS.

To any one having frequent opportunities of gathering information in the fields of chemistry and photography, it must be evident that the former, with all its delicate apparatus and reagents, has not yet arrived at that stage of perfection in which it can satisfactorily explain every kind of photo-chemical phenomena.

In this respect the observer will involuntarily remark an analogy between these phenomena and the combinations and decompositions that take place in the living organism of the animal and vegetable kingdoms.

The most deserving of notice is the process for producing the *latent* photographic image. The principal source of this image, as is well known, is the film of iodide of silver, in greater or less combination with nitrate of silver. The washing off the nitrate of silver solution from the plate is no exception to the rule, because it is not possible to neutralise the action of the iodide. Here we arrive at a point which deserves to be mentioned in the annals of chemistry. It is this: photo-chemical researches long ago proved that there are two modifications of iodide of silver; and there are also other physical differences between the two kinds. In my researches on these bodies, I proceeded in the following manner:—

I dissolved a given quantity of pure nitrate of silver in distilled water, and divided the solution into two equal parts, then added to each an equivalent of iodide of potassium dissolved in water. To one portion I then added a little more nitrate of silver, and to the other a little more iodide of potassium, and stirred the mixtures well together. This operation, as well as the next, was conducted out of the influence of daylight.

A remarkable difference was immediately discernible between the two deposits of iodide of silver. The one acted upon by nitrate of silver very quickly settled to the bottom of the glass vessel, in the form of a lemon-coloured powder; the other, treated with iodide of potassium, was a very bulky precipitate, nearly three times more so than the other, and nearly white in colour.

Both precipitates were repeatedly washed with distilled water, so long as a filtered portion of the washing was not clouded by a solution of common salt, or of nitrate of silver.

This external difference between the two precipitates was permanent. I next exposed a portion of both to the influence of the solar rays. In a very short time the iodide of silver precipitated with the nitrate of silver changed to a brownish hue, while the other retained its yellowish-white colour quite unchanged.

To distinguish these two modifications of iodide of silver, we will call that one which proved sensitive to light the + iodide of silver, and the other, — iodide of silver.

Both were then submitted to the action of sulphate of iron, but they both remained unchanged: even the + iodide of silver did not assume a darker colour; but the addition of a few drops of nitrate of silver caused both modifications to turn black. Two other samples of iodide of silver, when exposed to the light, were placed in contact with a solution of nitrate of silver, when they turned grey.

From this, it would naturally be supposed that an optical image thrown in the camera upon a film of — iodide of silver, and the collodioned plate then dipped into the nitrate bath, would become visible under the action of the developer; but such is not the case.

I then made the following experiment:—

A sensitised collodion plate was washed upon one-half of its surface with a dilute solution of iodide of potassium, and the plate then washed again, taking care that the water did not flow off the iodided portion on to the other. The plate was then put into the silver bath again for a few minutes, and afterwards developed.

On that portion of the plate acted upon by the iodide of potassium scarcely any traces of a picture were visible, whereas on the other portion a picture very quickly appeared, and was even partially solarised.

Next, a collodioned-plate was sensitised, exposed, and washed; then iodide of potassium poured over the whole of its surface; it was then washed, and again immersed in the silver bath. Under the action of the developer a strong negative picture appeared.

From these two experiments, we learn that iodide of potassium, employed before exposure, nearly destroys all sensitiveness to light, even when the — iodide of silver produced by it has been changed into + iodide of silver by the nitrate of silver after exposure, but that it is not capable of destroying the latent image after exciting the + iodide of silver by light.

I made another interesting experiment in this direction, the result of which will surprise those who have not undertaken it.

To prove that the iodide of potassium not only does *not* destroy the latent image, but actually preserves it against the further influence of light, a sensitised and exposed plate, which consequently contained the latent image, after being washed, had a solution of iodide of potassium poured over it, then it was washed again, and afterwards exposed to the full action of daylight.

It was then placed in the nitrate bath again for a few minutes, sulphate of iron developed, not a very intense, but still a very perfect, clear negative, with no signs of fogging. I leave it to every practical photographer to draw his own conclusions from these experiments, and to turn them to the best account.

There are two other important features in iodide of silver which indicate a modified condition of that salt. One, the least understood, is exhibited in what is termed "the reversed action of light;" the images obtained in this manner are sometimes termed "amphi-positives." The other feature concerns the altered qualities of the + iodide of silver in a dry state, particularly when forming part of the collodion film in the "dry process."

Several photographers, among others Poitevin, De la Blanchère, and Schouwaloff, have lately tried to produce this "reversed action of light" at pleasure; this action resides principally in the property of the + iodide of silver — imparted to it by, as yet, unknown causes, of darkening under the action of the developer, even without having been exposed to the action of light, but yet not of so decided a black as that of ordinary negatives, but of a reddish-brown, similar in hue to that assumed by strongly-lighted negatives when they are first submitted to the influence of pyrogallic acid. But while this latter continues to attract the reduced silver, and grow darker, the amphi-positive images appear to be deficient in this quality.

Working dry collodion plates has taught us that the *dry* photogenic film of + iodide of silver in connection with the organic substance collodion, if not exactly less sensitive to the action of light, has less power than the *humid* + iodide of silver to assume the deep black tones required in a negative, even if from the latter, as in the dry process, all the nitrate of silver has been washed off, and put on again by immersion in the silver bath before development.

The cause of this consists in a different molecular arrangement of the film, as is evident on looking at a dry and a wet collodion plate. The wet film after immersion in the nitrate bath assumes a yellowish-white colour, and is not transparent; whereas the dry film, after being washed and dried, is nearly transparent. The first represents, as it were, the hydrated state, and the latter the anhydrous, or free from water. Chemistry teaches us that many solid bodies exist partly in the hydrated condition, and partly in the anhydrous. For example, the yellow hydrated oxide of iron readily dissolves in dilute acids, while the red, anhydrous oxide requires both stronger acids and the aid of heat. Therefore it is very natural that the whole process of developing takes place much quicker, and with more energy in a wet plate than it does in a dry plate, since with the first there is an easier penetration of the film.

While the collodion film is drying on the glass plates, a not inconsiderable contraction takes place, which may be readily observed on the ridges of the glass plate, where the film will sometimes exhibit a shrinking to the extent of an eighth of an inch, or even more. This also explains the increased darkening in the negative after drying, in consequence of a contraction of the silver molecules, which, as it occurs in every direction at the same time, results in a scarcely perceptible diminution. If the cohesion of the film be lessened by adding too much water to the collodion, a very injurious cracking of the film takes place in the drying, whereby the darks of the negative are riddled by an infinite number of small net-like cracks.

In the hydrated state, the collodion film is much more easily penetrated by the liquids poured upon it. Therefore, in many photogenic processes of this kind, as, for instance, in the collodio-albumen process, there occurs not only a coating of the collodion film with albumen, but a more or less complete penetration of both substances.

On drying iodised collodion plates, which are coated with strongly-iodised albumen, it is frequently observed that the whole film becomes perfectly transparent, the cause of which is, that the + iodide of silver is dissolved in the iodide salts of potassium or ammonium, and converted into—iodide of silver. When these plates are subsequently immersed in the second nitrate of silver bath, a decomposition of the iodide salts takes place, upon which the film again assumes its original opaline appearance.

In many "preservative processes," hygroscopic substances are employed with a view of preserving the hydrated condition of the photogenic film. These agents certainly produce strong negatives much easier than can be obtained from a dried film. It will be both interesting and amusing to pass in review all the various substances hitherto proposed as preservative agents for collodioned-plates.

(*a.*) *Mineral Substances Proposed.*

1. Nitrate of magnesia.
2. Nitrate of zinc.
3. Chloride of lime.

(*b.*) *Substances derived from the Animal Kingdom.*

1. Honey.
2. Honey *cum* acetic acid (oxymel).
3. Gelatine.
4. Metagelatine.
5. Glycerine.
6. Milk.
7. Albumen.

(*c.*) *Substances derived from the Vegetable Kingdom.*

1. Syrups: solutions of sugar, with various vegetable additions, raspberry syrup, golden syrup (molasses), treacle, &c.
2. Gum-water *cum* sugar.
3. Wine (champagne).
4. Beer, malt wort, ale, porter, brown stout, &c.
5. Balsams, gum, rosin, resins, *ad infinitum.*
6. Linseed tea.

By the above bill of fare it will be seen that from the organic kingdom we are supplied with the principal ingredients of a frugal breakfast, as it may be composed of milk, eggs, beer, wine, and honey. This branch of the art might be appropriately termed "photographic cookery." The series of preservative processes, all of which are but palpable modes of obtaining the same result by analogous means, has served one useful purpose: it has ministered to the vanity of a host of would-be inventors and discoverers; and from the readiness with which every crude idea finds its way into print, a temporary notoriety has been conferred upon the ingenious persons who have suggested them. Much ink might have been saved if the editor of some photographic journal had at first published a list of all known hygroscopic substances capable of being applied without injury to the sensitised collodion film; any tyro in chemistry would have supplied him with as copious a list as we now possess, after the united efforts of some score of ingenious minds have, during the lapse of eight years, been devoted to the subject.

Of all the substances proposed as preservative agents albumen and transparent gelatine command a preference over the others, which nearly all belong to the sticky-stuff series, or form a sticky coating on the plate, whereby they attract the dust and light particles of matter floating in the atmosphere, which exercise a very mischievous influence during the developing.

The object of adding rosin or balsams to collodion for the dry process is to obviate the results arising from contraction of the collodion, as well as from the tearing and peeling off of the film.

THE ECLIPSE OF THE SUN.

The following account of the photographic expedition to Spain has been published by Mr. Warren De la Rue:—

In the belief that an account of the proceedings of the several parties composing the Himalaya Expedition to Spain may have some interest for the general reader, I venture to address to you the following summary of the observations made at Rivabellosa, a village near Miranda del Ebro.

The station selected was a threshing-floor, situated in latitude 42 deg. 42 min. north, and longitude 11 min. 38 secs. west, at the height of 1,572 feet above the mean level of the sea. The magnetic variation was found to be 20 deg. 20 min. west. The locality, being bounded by a beautiful panorama formed by the distant Pyrenean range, was well situated for observing the effect of the eclipse on the landscape.

My party consisted, beside myself, of Mr. R. Beckley, the mechanical assistant at Kew; Mr. Downes, Mr. E. Beck, and Mr. Reynolds. Mr. Clark, who, at Mr. Vignolles's suggestion, had acted as our interpreter, also volunteered his services, which proved most valuable during the eclipse. Each of my assistants had allotted to him a separate duty, and to their cheerful concurrence in carrying out my wishes must be attributed the successful result obtained.

My more important object was to endeavour to obtain photographs of the various phases of the eclipse by means of the Kew photoheliograph, an instrument I designed, at the suggestion of Sir John Herschel, for the special object of delineating the sun's image by means of photography. Although this was the primary object, I had also provided myself with ample means of observing the eclipse optically.

Our instruments and portable observatory, weighing very little short of two tons, were by previous arrangement conveyed in two days to my station by the kindness of Mr. Vignolles, to whom my thanks are especially due, and that of Mr. Bartlett, of the firm of Messrs. Brassey and Co., contractors of the Bilboa and Tudela Railway.

By the 12th of July we had erected the observatory, and by the 14th had obtained the first solar photograph in Spain. During these preliminary observations, photographs were made of the surrounding panorama by Mr. Downes, and the geographical position of the station ascertained by myself.

The climate proved to be most uncertain, and much serious interruption was experienced by the clouds, which frequently completely obscured the sun for the whole day. Much inconvenience was also experienced from the dust, which rendered it necessary to obtain large supplies of water, in addition to that required for actual use, in order to keep the station moistened; otherwise this enemy to photography would have prevented any good result from being obtained.

The Kew photoheliograph consists of a tube having the form of a truncated pyramid, at the smaller (upper) end of which is fixed the object-glass, 3 4-10 inches in diameter, and 50 inches focal length. The focal image of the sun formed by the object-glass is 47-100ths of an inch in diameter, but, before it is allowed to fall on the sensitive plate, it is enlarged, by means of a secondary combination of lenses, to four inches in diameter.

The sensitive plates, six inches square, are placed at the large end of the pyramidal tube of the telescope. The tube is what is termed equatorially mounted, and is made to follow the diurnal motion of the sun by means of clockwork.

In taking pictures of the sun the aperture of the object-glass is usually reduced by means of stops to two inches.

Even with this small aperture the duration of the exposure of the sensitive plate to the action of the sun is a very small fraction of a second of time. The exposure of the plate to the sun's action is effected by means of a sliding plate, having a very narrow slit in it. The plate, which moves in the plane of the primary focus of the telescope, is drawn downwards by means of an opening, and previous to taking photographs, is held up by a loop of thread fastened to a hook.

When a picture is required to be taken the thread is set on fire, and the plate flashes instantly across the axis of the telescope, and allows the image of the sun to pass momentarily through the slit on to the sensitive plate.

The clockwork driving-apparatus, although convenient, might actually be dispensed with in taking sun-pictures under ordinary circumstances, but at the period of totality in a solar eclipse it is necessary to expose the sensitive plate for some time to the more feeble light of the luminous prominences and corona, and then a clockwork driving-apparatus becomes essential; and it is also necessary to employ the full aperture of the telescope.

The photoheliograph is provided with position wires, which may be removed at will; when left in the tube they become depicted as dark lines crossing the sun's disc whenever a sun picture is taken, and serve to determine with great accuracy the position of any markings on the sun or of the cusps with reference to a normal line, for instance, with a circle of delineation.

The day previous to the eclipse was completely overcast, and the barometer was steadily falling. Nevertheless, four dozen plates were cleaned, so as to be in readiness for the morrow; but the 18th proved in the morning to be as cloudy as its predecessor, and it was with very faint hopes that we went to our station. At 12 o'clock the sky began to clear, and we obtained a faint picture of the sun through the clouds; about half-past 12 the clouds melted away as if by magic, and we had a clear blue sky (without a cloud visible), except on the distant mountains.

About 200 persons, who seemed to think that the eclipse was only to be seen from our station, rather interfered with our operations by their conversation, which completely prevented our hearing the beats of the chronometer; but the majority were persuaded, after a little while, to go on a neighbouring height, and the Alcalde Civilo Guinea, to whom I wish publicly to tender my thanks, and the Civic Guards induced the remainder to speak in a lower tone.

Just before and after the eclipse, sun-pictures were made, and during the progress of the eclipse 31 photographs were obtained, the times of which are carefully registered.

These will serve hereafter to determine the path of the moon across the sun's disc, and other data, with considerable accuracy.

The serrated edge of the moon is perfectly depicted in all the photographs, and in some of them one cusp of the sun may be seen blunted by the projections of a lunar mountain, while the other remains perfectly sharp. I continued during the eclipse to observe the sun by means of a telescope of three inches' aperture, by Dallmeyer, and I am enabled to confirm the results obtained photographically. As I observed the progress of the eclipse, I gave the signal from time to time for the taking of a photograph, so that some have been procured just as the moon passed across my conspicuous solar spot.

When the sun was reduced to a small crescent, the shadows of all objects were depicted with wonderful sharpness and blackness, and, as I cast my eyes on the now silent crowd, they and the landscape appeared as if illuminated by the electric light, so brilliant were the lights, so sharp and black were the shadows.

The sky began to assume an indigo tint, and the landscape to be tinged with a bronze hue. But a few moments, however, could be spared for these observations, and when I placed my eye again to the telescope, and removed the dark glass, some minutes before the totality, I distinctly saw the whole of the lunar disc, and perceived a luminous prominence on the east of the zenith. This was quite visible, while the sun's image was reflected by a glass surface fixed at an angle of 45 deg., in the eye-piece, and its intensity therefore much diminished. The upper surface of the glass diagonal reflector I had, however, silvered to the extent of one-half, and as I brought into action the silvered half just previous to totality, I perceived a large sheet of prominences on the east. A little to the east of the zenith a brilliant cloud, quite detached from the sun, and at some distance from the moon, came into view. A few degrees to the west of the zenith a minute point was perceived at the commencement of the totality. South of the vertical only one small prominence was perceived.

The brilliancy of these prominences far exceeded that of the corona. Much detail was visible in the protuberances both of light and shadow and configuration. No appearance of Baily's beads was seen.

Casting the eye for a few seconds away from the telescope to behold the corona and the surrounding landscape, I was much surprised to find that the darkness was not so intense as I had anticipated.

The deep indigo of the upper part of the sky shading through a sepia tint into red and orange as it approached the horizon, the deep blue of the mountains as contrasted with the orange sky, and the peculiar light cast on the spectator, impressed me with a feeling of solemnity never to be effaced, and which was enhanced by the ear catching the sound of the village bells, which, it appears, had been tolled during the eclipse. I saw two stars to the east of the sun, which I believe to have been Jupiter and Venus, and observed that the corona did not extend generally more than about eight-tenths of the diameter of the moon beyond her limb, but that there were outlying rays of greater extent. A thought of my other duties recalled me, after a few seconds' gaze, from this enchanting scene, and I did not attempt any exact observations of the corona.

To return to photography, when the disc of the sun had diminished to a small crescent I gave the signal to discontinue the ordinary pictures, and to take away the stop of the object-glass in order to have the full aperture ready for the totality; and the instantaneous apparatus was also disconnected. The signal to prepare plates for the totality was also made, and three plates, by a preconcerted arrangement, were coated and then sensitised in an extremely sensitive neutral bath, which I had prepared expressly for the purpose. As I could collect no reliable data as to the intensity of the light of the luminous prominences and corona previous to the expedition, I was working under great disadvantages, and I confess from all that I could learn previously I had very faint hopes of depicting the corona at all, and I was led to think, from the colour of the prominences, that if I did get a picture of the corona, my only hope was to get the prominences as dark markings on the supposed more brilliant corona. Although my own observations during the totality gave me greater hopes of success, it was with a thrill of pleasure that, in answer to my questions, I learnt from Mr. Reynolds that the picture was coming out under the influence of the developing fluid.

This first plate had been exposed by previous arrangement just one minute, and only time enough remained for a second plate to be placed in the telescope.

Just at this period the wind rose and shook the observatory and telescope violently. Had it been possible for me to have known beforehand how intense the light of the prominences really was, there would have been no difficulty in obtaining the photographs in much less time; and I do not doubt that four might have been procured with an exposure of from 20 to 30 seconds each.

(*To be concluded in our next.*)

ON THE PRESENT STATE OF OUR KNOWLEDGE REGARDING THE PHOTOGRAPHIC IMAGE.*

By a comparison of the developed images, formed on plates that have been exposed for the correct time to produce a good picture, with such as are produced by the direct action of the light, we arrive at two conclusions. First, a general similarity in the appearance of the various sorts of images by each method is observable; but, secondly, the deposit in the case of the developed image is far more abundant than that in the direct image. The comparison as regards the quantity of deposit in any two images is one far too delicate to be effected by the balance; but a method of instituting such a comparison with great accuracy is founded upon the ready conversion of any such images into sulphide of silver, a body transparent and yellow in thin layers, but passing through tones of sepia to almost a black opacity as the thickness is increased. The colour becomes thus a good means of comparing any two deposits, and the complete conversion of these into the sulphide is insured by the use successively of chlorine-water and of sulphuretted hydrogen. A similar comparative result may be obtained by substituting the chloride of mercury for the chlorine-water.

Now the deposited images in the case of the processes by development present some points of great analogy to those formed in the direct processes; in others these images widely diverge from them. Thus, we seldom find in them those purple and violet tones which seem to characterise the subchloride of silver before fixing. On the other hand, we observe two classes of developed images:—the one is of a dull metallic appearance, of a slaty grey character by transmitted light, and in but a feeble degree opaque; the other varies in colour, exhibiting brown or red hues, and sometimes even presenting perfect opacity to transmitted light, closely similar to the picture formed by direct processes. But, on testing these two varieties of image by the method of conversion into sulphide of silver before described, it is found that the dull translucent metallic image teems with silver, and becomes very opaque in the form of sulphide, while the more richly-coloured and dense-seeming image loses opacity under the sulphurising action, and exhibits at last a subdued tone of colour that brings it more on a par with the sulphuretted metallic image. Clearly, then, here, density, and the qualities which give photographic value to an image, do not depend on the amount of metal that goes to form it, so much as on the chemical, and even perhaps mechanical state, in which silver is present in it.

The several causes which determine the deposit of the images in these several states appear to be these:—

1. *The Materials Forming the Sensitive Film.*—Pyroxyline, in chemical purity, has little tendency to form the darker image. Albumen and the heterogeneous substances (including decomposed collodions), which we have had to yoke in the same class with it, have this tendency.

In general (speaking of the ordinary moist process), the tendency to produce the darker image is found to be in something like an inverse ratio, *cæteris paribus*, with the sensitiveness.

The use of the bromide of silver with the iodide, imparts to a collodion film a tendency to deposit the grey metallic image, at the same time that a more powerful reducing agent is needed to develop it. It is a remarkable fact, bearing upon this singular property of bromide, that no compounds analogous to that formed by A. Kremer with the iodide have yet been formed with it. In the case of albumen, this influence of bromide is not felt; for with albumen, bromide of silver is held to increase the opacity of the image.

2. *The Nature of the Developing Agent.*—The substances used to develop the latent image, besides the free nitrate of silver invariably necessary, embrace also without exception one ingredient, the character and the purpose of which is to reduce the salts of silver. In some cases organic bodies are employed for this purpose, in others the reducing agent is inorganic. Now, whether the grey or metallic form of image is completely reduced by silver, and the more opaque forms are an argentous compound (mixed or not with metallic silver), or whether all the forms of image are silver in different mechanical states of deposition, is a very important inquiry, and one on which the facts of the development and the nature of the developing agent may throw some light.

But no one who is intimate with the complex and perplexing details of this step in the photographic process, will expect the chemist to come in and remove the difficulty by the use of a few formulæ. All we can hope to do, is to point to a few sure results of experience, and indicate any explanation which may be suggested by facts from the laboratory analogous to these.

It is known, then, that to produce a "positive" picture in the camera, the developing agent should be sulphate of iron, acidified in some cases even by nitric acid. The result is the crystalline white deposit of metallic silver. Proto-nitrate of iron is used with a similar result. So likewise in the laboratory it is known that a neutral mixture of the ferrous sulphate and nitrate of silver forms the grey deposit, but that the addition of a little acid produces the white and brilliant form of the metal.

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* Concluded from vol. iv. p. 165.

If now we would take a result opposite to this from the experience of the photographist, we may select an ordinary collodion plate prepared by the usual negative process, and we shall find that protacetate of iron develops the image of a black colour. Now Rose, in the remarkable experiments on the production of argentous compounds with the higher oxides of iron, &c., to which we have called attention, shows that whereas the argentic salts containing strong mineral acids are precipitated as grey metal by ferrous salts containing similar acids, the deposit formed by uniting the ferrous oxide and the argentic oxide, or the compounds of these with organic weak acids, contain the suboxide of silver and are black.

When to this is added the circumstance that the white and grey photographic images are with facility amalgamated with mercury, but that the coloured and black images are not, it may be treated as a matter of high probability that the black and coloured images are formed by compounds of the suboxide of silver.

A directive energy is exercised upon the nature of the deposit by the various kinds of organic matter employed in the development. These all seem to restrict the limits of variation to the dark bluish-black (given by citric acid when present), on the one hand, and various reds and browns upon the other; while, again, the presence of the albuminous and other substances, so often before referred to, is, as was above remarked, a sure means of forming these darker and coloured images. Indeed, albumen will determine such images, notwithstanding that even free nitric acid be present with it. If it be a suboxide that causes the dark precipitate, that suboxide must go down in combination, and so resist the action of the fixing solvents.

But, 3. The character of the light has also a remarkable influence in inducing a grey or a dark character on the developed image.

If the picture has been produced by an intense light, as by a lens of large aperture, or as in the case of an exterior as contrasted with an interior view of a building, or as on a dull, misty day in contrast with a bright and sunny one, it will be found that, *cæteris paribus*, the tendency of the weaker action of the light is to allow the reduction of the silver in the metallic form. On the other hand, the more intense light has given to the molecules of the sensitive film a controlling energy which they exercise on the deposit, and which appears analogous to that of the light in the direct process, in its modifying the reduction and giving it the form of a production of an argentous compound; as though the iodic compound became in a certain sense phosphorescent to the chemical rays of the light, and operated on the mixed silver-salt and reducing agent as they float over it in the manner that the direct light might be supposed to do.

Of course, the materials must be nicely balanced, as regards their tendencies to produce the black or the grey images, for the peculiar action of an intense or a weak light to be made fully evident. Albumen, or powerful organic agents, will usually destroy this balance.

One fact remains to be observed. Whatever may have been the character of the first particles deposited on the plate, that character will be maintained thenceforward, and fresh deposits may be, so to say, piled upon the first by the singular agglutinative tendency of crystalline deposits, so long as the necessary conditions of fresh silver solution and of fresh stores of the reducing agent be supplied to keep up the action.

Our task has been, by an investigation of the chemistry of the image in its different varieties, to afford some data, at least, by which the further step may be hereafter taken of determining the precise character of the photo-chemical agency, to whose marvellous influences art owes so many beautiful results, and science is indebted for more than one intricate problem.

The Photographic Tourist.

A STROLL ON THE BANKS OF THE THAMES.

"Distance lends enchantment to the view," while, in the expressive language of the school copy-books, "Familiarity breeds contempt." These sayings, it may be admitted, have lost the charm of novelty, but they are so true and so apposite to my subject, that I repeat them confidently.

It used to be said, even in the historical period when railways were not, that in no part of the globe, habitable or otherwise, did there exist a solitude so wild, a fastness so remote or inaccessible, but you would find there an English tourist, with his nose in the air, and, probably, with a Murray's Hand-book in his pocket. Beside this tourist you now inevitably encounter a photographer.

We, or I should rather say they—on such a theme one's sense of decency drives one into the third person, though I too have lived in Arcadia—they are indefatigable. They are to be found everywhere—climbing Alpine heights, and developing at once their muscles and their pictures, practising a variety of dry processes in the midst of Arabian deserts, or preparing a silver bath on the banks of some shining stream. Although, in the first instance, the results attained are but of a negative character, the benefits ultimately derived from their labours are positive, both as regards the pocket of the operator and the instruction and entertainment of the public.

A pursuit which ministers so much innocent gratification to innumerable private families, cannot be other than praiseworthy, nor do I for an instant blame those photographers who, in making their arrangements, may be guided by the venerable sayings quoted above. They supply the sort of article most in demand; and the same feeling which makes the British tourist prefer Como to Katrine or Killarney, induces all my acquaintances to buy foreign stereographs, and the more eccentric and remote the better. What can be more agreeable, it may be said, than to travel round the world in this manner? I admit it, if the object be to travel round the world; but, if you are looking for charming scenery, I venture to say that nothing better is to be had than may be found in these islands.

Perhaps it may be worth while, then, to investigate the comparatively unknown localities which lie in our immediate neighbourhood. I have heard it said, that groups as picturesque may be met with in the Adelphi Arches or St. James's Park as at a Spanish *venta* or a *café* in Algeria; but, as we are now in search of landscape, let us go a little further, and stroll up the banks of the Thames.

It will be well to begin our walk a few miles above London, not because the subjects are better—for good subjects abound in every part of the river—but because one gets out of the way of that peculiar species of boy known as the London boy, and distinguished as the most intrusive, impertinent, and unmanageable description of boy at present known. Boys of this kind have been known to produce a confused, spectral appearance, in a valuable negative, by throwing a series of somersaults in front of the camera at the critical moment—a proceeding objectionable in itself, and calculated to induce feelings of irritation in the breast of the photographer. The Thames, at London, too, has fallen into ill odour of late years, especially during the dog-days; and, although this year the dog-days appear to have been postponed *sine die*, there is no reason why we should linger amidst fog and foul emanations when the woods and fields are calling us away.

Picturesque views may be obtained at almost every bend of the river, even from Vauxhall Bridge. The view of the beautiful Suspension Bridge, at Battersea, is now, however, marred by the proximity of a new railway bridge, built within a few yards of it. Cheyne Walk, Chelsea, would give the photographer a quaintly-picturesque picture. Old Battersea Bridge, and Chelsea Church, with its monument to Sir Hans Sloane, Chelsea Hospital, Fulham, and the residence of the Bishop of London, Barnes Terrace, and the Railway Bridge across the Thames at that spot, afford the materials for excellent pictures. Even Barnes Common would yield a portfolio of studies.

If the time at your command is short, I should recommend you to go to Richmond at once by rail, where a dozen good "bits" may be got in a day without much difficulty; but, in the present instance, I propose to join the river at Putney, getting there either by omnibus from the Bank, the White Horse Cellar, Piccadilly, or by the South-Western Railway. As you have your apparatus with you, perhaps the rail is to be preferred. You will remark that, on this line, there appears to be no particular hurry on the part of any one. The train is in no hurry to start, the porters are in no hurry to put you into a carriage, and the engine proceeds in a leisurely, contemplative sort of way towards its destination. Putney, however, is only five miles distant, and, accidents excepted, there can be no doubt of your ultimately getting there.

Here you may prudently abandon the railway and walk to the banks of the river, through the pleasant main street of the village. On this part of the Thames, immediately above Putney-bridge, is the course of the Thames regatta, and numerous amateur watermen make this their place of exercise. It would not be difficult, with a little management, to get an effective view of a boat-race; but the river itself at this point is sufficiently picturesque to dispense, if need be, with any such accessory. Putney-bridge is a wooden structure with many arches, not undeserving of notice.

Crossing over the bridge, a walk of two miles brings us to Chiswick, a very quiet village, consisting chiefly of rows of modern houses so attenuated and ill-built, that they seem to need the support on either side, which, according to the modern fashion of building, is never wanting. The grounds of Chiswick House, the residence of the Duke of Devonshire, are laid out with great taste, and the artist who can obtain the *entrée*, will find some telling scenes of artificial beauty. The house in which Hogarth lived for many years, is also here; but the associations connected with it alone render it worth a visit. Shut in now by a number of poor houses, it was probably, in Hogarth's day, a very pleasant summer residence.

As we advance from Chiswick to Kew, the colour of the Thames mud gradually varies from an impenetrable black to a vandyke brown, and the atmosphere of the river grows purer and less offensive. Many pretty views present themselves on either side: old mansions, embowered with trees; meadows, fragrant with spring flowers; villages, with distant uplands appearing as the background; while the smooth river curves gracefully by, unheeding the train which, with a snort and a shriek, rushes at intervals across its bosom.

At Mortlake there is nothing that need detain us. All things dirty, irregular, and ruinous, become picturesque and charming when exposed to the magical operations of photography; and, therefore, a view may be taken of Strand-on-the-Green, placing your camera judiciously. Here, it is currently reported, lived the late Mr. Joseph Miller, who, having in his day published a small collection of witticisms, has since been made responsible for innumerable barbarous jests, of which he was wholly innocent. Strand-on-the-Green is a place to pass through as quickly as possible, and we will, therefore, get on to Kew.

There is an old-fashioned air about the village of Kew which is extremely pleasant to the weary dweller in a town. The houses, instead of being crowded together so as to exclude as much air, and generate as many nuisances as possible, are ranged round a spacious green, on one side of which numerous taverns, with tea-gardens, more or less rural, tempt the tired wayfarer. Kew produces, or attracts—I do not pretend to say which—a greater number of orange girls than any other place I am acquainted with, and these are supplemented, in the strawberry and apple seasons, by a great variety of little children, who beg you to buy something "from my grandmother's garden, sir," a transparent fabrication. Running the gauntlet of all these, you may, if you please, take a ramble in the celebrated gardens, which are the great attractions of Kew.

These gardens were formed upon the site of the old Kew House and grounds, which became tenanted by the Prince of Wales, father of George III., in 1730, and was afterwards purchased by the Crown. Under the direction of the Dowager Princess of Wales, the gardens were re-arranged in the style of that age; and numerous temples, mosques, pavilions, &c., were erected in the grounds. Of these, the Chinese pagoda still exists, and is a striking object 163 feet high, formed of ten storeys. In the year 1840, the Queen made a present of these gardens, which had fallen into a very neglected state, to the Commissioners of Woods and Forests, for the benefit of the public—one of the most popular acts of Her Majesty's reign. I do not know a more charming view about London than that from Kew Bridge. Looking down the stream—the time, evening, and when the river is studded with boats and barges—its interest is much enhanced. The view looking up the river—with the gardens on the left, and old Brentford on the right, with the islands or aits in mid-stream—possesses much interest. It should be taken at early morn.

After passing Kew, we obtain the first glimpse of the unveiled beauties of the Thames. We have got rid now of dirt, and smoke, and steamers, and the river flows between banks, richly wooded, exhibiting all the varied beauties of the summer foliage. On the further bank, inclosed in its spacious grounds, stands Sion House, the mansion of the Duke of Northumberland, near the site of the ancient monastery of Sion, suppressed by Henry VIII. All traces of the monastery have now disappeared; and, although tradition asserts the existence of two subterranean passages, one extending under the bed of the river, nothing of the kind has ever been discovered. The present mansion, which has been several times altered and re-modelled, is a large, solid-looking building, with nothing remarkable about it; the grounds are very beautiful. About Isleworth there are several views which we may probably think it worth while to carry away with us. The church tower, as seen from a distance, is a picturesque object, but we shall find nothing in the village itself to repay us for the trouble of visiting it. Further on, the river is skirted on either side by Richmond Park and Twickenham Park, the latter famed as the residence of Bacon. Here it was that, in the midst of a profound seclusion, he planned out and executed a considerable part of the *Novum Organon*, and declared, long afterwards, that he found the situation very favourable for "the trial of philosophical conclusions." The house in which he lived was pulled down early in the present century.

A few minutes' walk now brings us to Richmond; and, as we pass by the bridge, new scenes open up to our view, and claim at least an admiring glance. But the bridge, or bridges—for there are two now—form a striking feature in the landscape, and the photographer should improve the opportunity, and add views of them to his portfolio. A view from the old bridge, looking either up or down the river, is worth possessing.

Richmond is better known to Londoners than many other spots near the metropolis. All the small somebodies in town either have dined, or mean to take an early opportunity of dining, at the Star and Garter; for with certain persons the enjoyment of "the beauties of Nature" means a dinner in the country, with a view from the dining-room window! People, who are mere nobodies, go down by crowds to Richmond, in the summer, and, despising the sour grapes of the celebrated tavern, partake of nuts and oranges on the hill. A description of such a place is almost an impertinence, although a good deal might, under other circumstances, be said about Richmond. The view from Richmond Hill is charming at all times, but especially so at the season of spring, in the evening, or early in the morning, when there are as few visitors about as possible. Crinoline and pyramidal trousers, wonderful inventions though they be, and curious in a scientific point of view, are yet painfully incongruous in the midst of green fields and stately trees. Surrounded by the fresh beauty of Nature, these artificial men and women, so singularly built up and decorated, are out of place. Instead of the sweet fragrance of the violet and the May blossom, we are oppressed with the odour of frangipani and Houndsditch cigars; instead of the admiration with which such a scene should inspire all honest hearts, we hear some genteel slip-slop, or scraps of town scandal.

Let us plunge into the woods.

(*To be continued.*)

Critical Notices.

*Shepherd and Co.'s "Universal" Guide to Photography.**

As this Guide is published for trade purposes, it scarcely comes legitimately within the scope of the reviewer's pen. We may say, however, that it contains clear and simple directions for obtaining collodion positives and negatives, both on glass and on paper, with the manipulation of the most approved dry processes, and details of the method of making stereoscopic pictures. It is evidently written by an experienced practical photographer, and, upon the whole, appears to be a tolerably safe guide. Upon some disputed points we may differ from the writer, but who is to decide when doctors disagree? The addition of ether and alcohol to the nitrate bath we do not approve of, although it is frequently recommended; nor do we now endorse the compound toning-bath of chloride of gold and hypo.; the reader has, however, his choice, for Maxwell-Lyte's formula is given also. Mr. Moxham's modification of Taupenôt's process is fully detailed, as well as Mr. Fothergill's; so that a good deal of information is condensed into the compass of a small book.

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* London: G. Marlborough and Co., 4, Ave Maria Lane.

A Catechism of Chemistry.

HEAT—(*continued.*)

Q. Besides gaseous and liquid thermometers, are there thermometers made of solid substances?

A. Yes; there are what are called *pyrometers*, or fire measurers, on account of their being used for determination of high temperatures.

Q. How are these constructed?

A. Pyrometers depend upon the expansion by heat of metallic rods, measured by a delicate scale. They are not much used, being liable to give inaccurate results, unless great care is taken in their employment.

Q. Give some of the more remarkable points of temperature.

A. The greatest artificial cold which has yet been produced is — 220° F. The greatest natural cold recorded, = — 56° F. Mercury freezes at — 39° F. Ice melts at 32° F. Water boils at 212° F. Mercury boils at 662° F. A red heat is about 980° F. Silver melts at 1,870° F.; and cast iron melts at 2,780° F.

Q. Is the power which metals possess of contracting by cold and expanding by heat taken advantage of in any manufactures?

A. It is very frequently applied to a useful purpose. The wheelwright makes the iron tire a little smaller than the wheel itself, and then forces it on in a heated and consequently expanded state. On cooling, it contracts, and binds the wheel firmly together. Walls have been straightened, also, by the force exerted by the expansion and contraction of iron rods alternately made hot and cooled.

Q. What power does a rod of metal exert, when expanding or contracting in this manner?

A. In a variation of 80° F. (a difference which is frequently experienced in this country between the extreme temperatures of summer and winter), a rod of wrought iron ten inches long varies in length $\frac{5}{1000}$ of an inch; and if its extremities are securely fastened, it exerts a force of about fifty tons upon the square inch.

Q. Are any precautions required to be taken in buildings and engineering works, to guard against damage arising from this variation in length?

A. Yes; in laying down gas and water pipes, some slight elasticity must be allowed at each joint, as a rigid cement would be fractured. The rails on a railroad are also laid down with a small interval between them. Tho rails on a railroad 500 miles long would be a quarter of a mile longer in summer than in winter. The Britannia tubular bridge is liable to vary in length nearly three inches in twenty-four hours; and special adaptations had to be contrived, at the support at the extremities, to allow of its movement on this account.

Q. How does it happen that any bodies, when left near each other, gradually become of the same temperature?

A. The equilibrium of temperature is maintained in three ways—by *conduction*, *connection*, and by *radiation*.

Q. What is meant by *conduction?*

A. The conduction of heat is the property of allowing it to travel along, which many bodies, especially metals, possess.

Q. Give an illustration of the conduction of heat.

A. If a cold piece of metal be placed in a hot liquid—a spoon in a cup of tea, for instance—it will very soon be as hot at one end as at the other, owing to the heat being conducted along it. A piece of glass, under the same circumstances, would not, however, become sensibly warmer at the unimmersed end.

Q. Give the conducting powers of some of the more common substances.

A. Taking the conducting power of gold as 100, that of copper would be expressed by 89·8; iron, by 37·4; lead, by 18; porcelain, by 1·2; and fireclay by 1·1.

Q. Next to metals, what bodies possess conducting powers for heat?

A. Other solid bodies rank next to metals in their conducting powers; then come liquids, which have the property only in a very limited extent; and then gases, in which the power of conduction may be considered to be absent.

Q. If liquids possess the power of conduction of heat to so limited an extent, how does it happen that water can be so readily heated to the boiling point?

A. Water becomes heated throughout its mass by the property of *connection*, not by conduction.

Q. Explain the meaning of connection.

A. Connection means the carrying of heat from one place to another. When a vessel of water is placed over a source of heat, the layer at the bottom becomes raised in temperature. It consequently becomes expanded and lighter, and, rising up to the surface, has its place occupied by a fresh layer of cold water. This, in its turn, acquires heat, which it *connects*, or carries away, and gives place to more cold water. In this manner the heat is gradually distributed throughout the entire mass.

Q. To what useful purpose is this property of the connection of heat by water applied?

A. The motion communicated in this manner to heated liquids has been ingeniously applied to warming buildings. A series of pipes are so arranged as to admit of a continuous circulation of water. A furnace is lighted at the lower part, and the whole being filled with water, the heat gives rise to a continuous circulation of warm water throughout every portion of the building in which the pipes have been carried.

Q. Does the property of connection of heat belong to other substances beside liquids?

A. Yes; gases also possess it, they following somewhat the same laws, in this respect, as liquids. The important subject of ventilation of buildings, &c., depends upon this property, which warm gases have, of being lighter than cold air, and thus producing ascending currents. The draught in chimneys also depends upon the ascensional power of the warm air in the chimney over the cold outer air.

Q. How is it, then, that chimneys ever smoke?

A. Chimneys smoke either on account of some obstruction in the chimney impeding the ascent of the air, or, more commonly, owing to the care taken to exclude draughts of cold air in the room preventing the ingress of air, to supply the place of air going up the chimney. The old air, consequently, enters by the chimney in gushes, and brings down a chimney-full of smoke, each time, with it.

Q. Is there any explanation of the fact of a fire always burning brisker when there is a frost?

A. Yes; the colder the outer air, the greater will be the difference between the temperature of it and the air in the chimney; consequently, the ascensional power, or draught, will be greater. In addition to this, cold air is slightly denser than hot air; and, consequently, a given bulk of cold air passing through the fire contains more oxygen than if it were warmer. Combustion is therefore so much the more vivid.

Q. What, then, is necessary to be remembered in ventilating a room?

A. It must be remembered that the foul air has a tendency to rise to the upper part of an apartment, as it has become heated by respiration, or by the burning of candles; the aperture for the egress of the foul air should therefore be at the upper part of the room, and contrived in such a manner, that the spent air does not go into a passage or other room, but either into a chimney or into the outer air. Apertures for the ingress of cold air (which, if desirable, may be artificially warmed) should consequently be provided near the floor, and in such number and size that there is no excessive *draught* through any one of them. The fresh air should, of course, be taken direct from the outer air.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 5th August, 1860.

I have been waiting rather impatiently for news of the eclipse. I am now satisfied, for the papers here are just full of it.

M. Petit, director of the Observatory of Toulouse, has written a long letter from Briviesca, to the paper *L'Aigle*, of that town. He says, that in Spain, they were first fearful of bad weather, but fortunately it remained fine. He never saw anything so imposing as this admirable spectacle. He measured the red protuberances, whose dimensions were, on this occasion, enormous, and whose forms proved to him that they are really immense clouds floating in the vast atmosphere of the sun.

Two of them measured 20,000 leagues in breadth, and 80,000 in length.

M. Petit also measured the height of the solar atmosphere, which he found to extend in its least dense and most irregular portions outside of the photosphere, to 45 minutes of a degree, at the very least, which equals a height of about 500,000 leagues. As to that portion of the atmosphere which forms a regular uniform corona, it subtends an angle of about 15°, and extends, consequently, 180,000 leagues from the surface of the sun.

M. Prazmowski writes to the *Cosmos* from Briviesca, 15 minutes after total obscurity:—"I have contented myself with measuring the polarisation of the crown of protuberances. It would be too long to describe my apparatus. I write in haste upon a barrel, which serves me as a table. I must say that my two polariscopes, the one destined for the protuberance, the other for the corona, have given results free from every kind of incertitude. The corona was very strongly polarised in the plane of the radius of the moon; the protuberances were not so at all. I can say nothing of the ashy light of the lunar disc; its intensity was so feeble that it disappeared by the side of the corona."

MM. Baudrimont, Roulin, Howel, Royer, and Micé, addressed to the Academy the results of their physical and meteorological observations made at Bordeaux during the eclipse. It was the authors' desire to study everything relative to light, heat, atmospheric pressure, hygrometry, and magnetism.

Light was studied in its optical intensity and its chemical intensity. The optical data were determined by a photometer invented by M. Baudrimont, consisting in the extinction of the light by two coloured prisms of different thickness, and with parallel sides.

The chemical intensity of light was determined by exposing sensitised paper for one minute to the sun; each strip, fixed by hyposulphite of soda, was then placed upon a sheet of white paper, and the hour of the observation marked at the side of it.

For the temperature, three thermometers were employed, one in the shade and two in the sun. One of the latter had its bulb blackened with charcoal, so that it might be seen what was owing to the radiation of the sun, and what to that of the atmosphere.

Besides these instruments there was a Nobili's pile communicating with a galvanometer, which was also used as a differential thermometer to distinguish between the temperature of the sun and that of the atmosphere; one of the sides of this pile received the direct solar rays through a blackened cone, whilst the other side was carefully protected from them.

The atmospheric pressure was measured with a Fortin's barometer; the moisture by a condensation hygrometer. As concerns magnetism, it was the intention of the authors only to observe whether terrestrial magnetism is influenced by an eclipse. The results of the observations have been tabulated. As might have been supposed, the minimum of optical and chemical light corresponded to the maximum phasis of the eclipse. The indications of the thermometer in the shade were generally inferior to those of the thermometer in the sun; the black-ball thermometer was always higher than the other, except at about three o'clock, that is, at the maximum of the eclipse, when they all three indicated nearly the same temperature.

The barometrical variations were not very marked. The hygrometer furnished very interesting results, showing that the humidity of the atmosphere increased during the eclipse, in the proportion of 1 to 1·6, diminishing again afterwards.

The magnetic observations were not worth recording. The observers were more than once troubled with clouds.

M. Goulier addresses to the Academy three photographic proofs of the eclipse, taken at Metz by Captain Lamey. On the third of these proofs there is a remarkable aureola, which encircles the visible portion of the sun. The author did not observe the same with the naked eye, or with the telescope.

M. Vernier *fils* also sent photographic proofs of the eclipse from Belfort, together with some observations of temperatures. The proofs are very small, having been taken with a single landscape lens. They were obtained on collodion in a fraction of a second, during the greatest phases of the eclipse.

At Algiers the sky was very clear. During the eclipse the thermometer only descended two degrees; but at the summit of Sidi-Merraond a thermometer placed in the sun, and which marked 95° F. at 3h. 7m., only marked 75° at 3h. 29m. The planets Venus and Jupiter were perfectly visible to the naked eye. The natural phenomenon of which I speak produced a terrible sensation among the indigenous inhabitants of Algeria. The women cried, and tore out their hair; the men prayed the whole time, or beat a kind of gong; the shepherds rushed terrified into the villages, driving their cattle before them, belabouring them with sticks.

At a small village in Spain, a cock and a hen were seen feeding in a garden. As soon as total darkness approached, they both marched off to roost. But as they had some distance to walk before they reached their pens, the returning light of the sun overtook them on the road, so they quietly walked back again into the garden.

[Erratum.—In my letter printed in the "Photographic News" for July 27, when speaking of M. Jourdes' new pyrometer, I am made to say, "The thermometer in the oil always indicates the degree to which the interior of the furnace is heated." Now, it might be understood from this that the thermometer in the oil really showed the temperature of the oven, which is absurd. It should have been stated that "the thermometer in the oil indicates the same degree when the interior of the furnace is heated to the same point." Thus, for instance, we will suppose that whenever the interior of the furnace ranges from 3,500° to 4,000° (cent.), the thermometer in the oil will constantly mark from 115° to 120° (cent.).]

THE ALBUMEN PROCESS.

Sir,—Permit me a word of reply to the letter of "An Amateur," in the "News" of 27th July. Comparing the process I described in that number with Coale's, he says, "*Nor does he add so much sugar syrup to the albumen, while his proportions of iodide and bromide in the albumen are better.*" The formula given by me in No. 91 of "Photographic News," was copied *exactly* from Mr. Coale's "Manual of Photography," published in 1858. Perhaps "An Amateur" did not compare it with the same version of Coale's process. His suggestion about the iron developer may be useful, and deserves to be tried.—Yours, very truly,
James Archer.

Strutt Street, Manchester, 7th Aug. 1860.

Miscellaneous.

Heating Apparatus.—Professor Silliman makes the following lucid remarks on this subject: "Steam contains, as you know, an enormous amount of heat. The amount of heat which steam contains is at least twenty times as much as can be taken in a like weight of water; that is, a pound of steam contains twenty times as much heat as a pound of water can contain. After water has been converted in the boiler to the point of ebullition, made to boil—that is, when it has reached the temperature of 212°—it cannot be made hotter, but the heat still continues in the water; and the question is, what becomes of it? It is used up in converting the water into steam, and the steam which is converted from water, if under a pressure of one atmosphere, has only the temperature of 212°. If you mark the amount of heat (and it may be done with perfect accuracy) which has passed into water to raise it to the temperature of 212°, and then watch it till it has all boiled away, you will find that the amount of heat that entered into the water (granting that the source of heat continues constant), and which has been necessary to convert the whole into steam, would, had the water been a solid substance, have heated it red hot; in other words, it has 1,000° of heat which are not sensible to the thermometer, and of which you have no evidence as long as it remains in the condition of steam; but the moment the steam becomes condensed and turned into water, then this heat is all given out again. It is for that reason that steam is so intensely, so remarkably energetic as an agent for heating, that while the surface where the steam is need never, and will never, if the pressure does not exceed one atmosphere, exceed 212°, the quantity of heat which is given off in a given time will correspond to 1,000°; that is, the conversion of a given quantity of steam back again to water will set at liberty 1,000° of heat. This explains to us the otherwise unaccountable energy which steam has as a heating agent. In the ordinary mode of distribution of heat in the small pipes, it is common that this pressure should be higher than one atmosphere. It is common to have it up to a temperature at which long exposure would char wood. That involves the reality of danger; but to avoid that, this apparatus has been contrived. As you must have some radiating surface, this kind of radiating surface has been adopted. This is nothing but two plates of sheet-iron, counter-sunk upon one surface, and fastened together with numerous rivets. Into this chest, which is really a thin chest of air, the steam is admitted at one corner, while the air escapes at another (this escape of air is also automatically managed), at the same time this orifice is so adjusted, that if the whole area of the radiator is not desired—if the entire heating power of the surfaces is not wanted in a particular case, it can be closed at any moment, so that you can bring into action any part, according to the necessities of the case. . . . . There is nothing in steam that will oxidise iron. Every engineer knows this perfectly well. He knows that the interior of his apparatus is not oxidised. If the interior is protected by an adequate coat of varnish, there can be no sort of danger from oxidation. Steam contains no oxygen. It is vapour of water, and is destitute of common air; and these inner surfaces, when cut open after five years' use, are just as perfect as the day when they were put up; and even the very marks of the manufacturer, put in with white paint, show perfectly. Many persons say, if you desire a good radiating surface, why take iron? Why not take copper? Simply because it is not the best radiating surface. It is a fact that, among all metallic substances, cast-iron has the most energetic radiating surface, and the American sheet-iron stands next to it. It will radiate more degrees of heat than any other metallic substance which is adapted to the construction of a radiator."

Photographic Notes and Queries.

IMMORAL PHOTOGRAPHS.

Sir,—The answer to the question put by "A Londoner" is this the police do not do their duty. The indecent stereographs exposed in shop windows but faintly indicate the character of others which may be obtained inside, and I can only hope that the majority of the public are not aware of the extent to which this infamous traffic is carried on. The police must be aware of it, but it is winked at. If the heads of our police wished to put down this traffic, two intelligent detectives would in one day disclose, in apparently respectable shops in the neighbourhood of the Strand, such a mass of pollution as would startle the public. But it is evident that they do not wish it.

There are two regular manufactories of obscene stereographs in the metropolis to my knowledge, probably more; one is at Kentish Town, and the other is at Clapham. The conductors of these establishments frequently advertise, offering employment to young ladies, their object being to obtain them as sitters; and thus, probably, not a few poor women are lured to destruction—at any rate, they are exposed to gross insult. These establishments issue circulars descriptive of their infamous wares, and send them to junior officers of the navy, the army, the merchant service, pupils and tutors of public schools, students of universities, &c., and it cannot be questioned that the injury thus done is incalculable. A friend of mine sent one of these circulars, with the address of the "manufactory," to the Chief Commissioner of Police, but no notice was taken of his communication, *and, as far as we know, no action followed upon it!*

At all events, no serious attempt is made to suppress this trade, which is sapping the very foundations of public morality. So long as the police authorities continue their criminal supineness, such acts as that of Lord Campbell are a mere dead letter.—Yours,

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Sir,—Your correspondent, "A Londoner," has done good service in calling attention to the prostitution of the beautiful art of photography to the obscene subjects which have been the occasion of Lord Campbell's legislative enactment. I do not, sir, believe that the public are at all aware of the demoralisation introduced, even among the higher class of females (I speak advisedly) by this application of photography. Stereoscopes of the most obscene and lascivious character are in more common circulation than is supposed; and can be found lying, *perdu*, in many aristocratic boudoirs! Complaints are general of the deteriorated morals of London society; be assured that photography has, unhappily for those who admire and practise it as an innocent pastime, been one of the main agents of infusing a meretricious spirit into every class of society.

Censor Indecens.

TO CORRESPONDENTS.

⁂ We beg to inform our readers that after the issue of No. 102, the "Photographic News" will cease to be published by Messrs. Cassell, Petter, and Galpin. Further particulars will be announced next week.

Good for Trade.—There is nothing better than cyanide of potassium for removing the stains of silver. Place the articles for a few hours in a pail of soft water, lift them, drain and wring, then pour on the solution of cyanide, and rub the spots with a nail-brush. What effect the solution may have on the dye depends upon the nature of the latter; therefore the experiment had better first be tested on a waste piece of the cloth.

Enquirer.—There is no book extant on the practical use of the camera lucida. The instructions are very simple. When the instrument is adjusted, the outline of the picture is simply traced with a pencil on the paper upon which the picture *appears* to be depicted. The sulphuric acid sold by operative chemists is what is indicated.

Oxon.—If the silver solution be allowed to stand uncovered in the bath, dust, &c., accumulates on the surface, and stains the collodion plates when immersed in it. It is a good plan to return the bath solution to the stock bottle when you have done working, and filter it, if it be necessary.

Upton.—We have to change our opinions with the progress of knowledge. It would be the worst kind of folly to adhere to an opinion formed a year ago on a good foundation, against the truth disclosed by more recent investigations.

Fog.—Your query is so confused and obscure, that it is impossible to discover your object. It would seem as if you imagined that words were for the purpose of concealing one's thoughts.

Silver Bath.—The best plan is, to keep a few ounces of silver solution, of greater strength than the bath, in the stock bottle, and mix your bath with it occasionally, and filter.

Pyro.—We do not know how that particular collodion is made; other collodions answer equally as well. You can buy *plain* collodion, and iodise as you think proper.

Pons.—All those white pigments are composed of carbonate of lead; ivory black is burnt bones; lamp black is soot; blue black is vegetable charcoal, burnt vine twigs, &c.

F. F.—If you were asked for a reason for your treatment of your silver bath, you probably could give no better one than that you thought it would do some good; but you should also have thought it might do some *harm*.

H. Newman.—The picture looks as if the washing water contained a trace of hyposulphite of soda. The mottled stains are apparently hyposulphite of silver.

A Constant Subscriber.—You are not a constant reader, else you would not retain so many obsolete notions with respect to toning and fixing. All your queries have been answered lately in the "Photographic News."

G. C.—An account of the Solar Camera appeared in No. 75 of the "Photographic News." The account of Mr. Warren de la Rue's method of instantaneous photography appeared in Nos. 97 and 98.

A Young Beginner.—To answer all your questions would require a treatise of 150 pages. Such an one was reviewed in No. 99 of the "Photographic News."

Laura.—A twin-lens stereoscopic camera is to be preferred. Five pounds will be ample for your present outfit. Take a lesson or two from a practical photographer.

Justitia.—Try an advertisement in a leading literary or general newspaper. The number of artists employed in Government offices is at present very small.

W. W.—We have sufficient confidence in our own judgment to pursue an independent course, uninfluenced by the vagaries of the eccentric.

A. Z.—We are not in possession of the formula: it is the author's secret, which he keeps.

N. E. F.—The lines appear to be due to scum on the nitrate bath. Filter the solution, and also clean out the bath with dilute acid and a strong feather.

Tyro.—You cannot understand the matter without some knowledge of the laws of chemical phenomena.

G. H. D.—It does not signify which developer you use; adhere to that which gives the best result.

Vit.—We have generally found varnished pictures to come readily from the glass when laid to soak for a few hours in water.

Susan K.—If you prefer plain paper for positives, you must take English paper—say Hollingsworth's.

Omega.—You will find the philosophy of fixing fully explained in MM. Davanne and Girard's articles on positive printing.

Nit. Sol.—We shall publish M. Disderi's formula for *photographic ink* as soon as he makes it public.

J. W.—We give the preference to iodide of cadmium in the sensitising solution for collodion that has to be kept a long time.

Sam's Son.—The fault appears to lie in careless manipulation. The chemicals alone could not commit such vagaries as you describe.

M. M. D.—Strain the calico, and give it one or more coats of an elastic varnish, or drying linseed oil, or india-rubber dissolved in camphine.

Harvey Goble.—The coloured effect you describe is not unusual.

⁂ All editorial communications should be addressed to Messrs. Cassell, Petter, and Galpin, La Belle Sauvage Yard, London, E.C.

THE PHOTOGRAPHIC NEWS.

Vol. IV., No. 102.—*August* 17, 1860.

COLOUR IN ITS RELATION TO PHOTOGRAPHY.*

BY CHARLES MARTEL.

The colour generally preferred by English photographers for their productions is stigmatised by eminent foreign critics as cold, unnatural, and monotonous. The particular hues to which we have given the preference may be simply a matter of taste or fancy, yet sufficiently marked to characterise the English school of photography, and, consequently, to become elevated into a national characteristic. Be that as it may, of this we may be certain, that in a miscellaneous exhibition of photographs, the productions of artists of various nations—as in the recent Architectural Photographic Society's Exhibition—it is quite an easy task to pick out the productions of English photographers by their peculiarities of colour, apart from other characteristics.

It cannot but be worth while to consider in what, in the eyes of continental photographers, our defects of colour consist. By comparison with their productions, it would appear to lie in our general preference for cold, purple hues, in which all subjects—portrait, landscape, and architecture—are indiscriminately clothed. Our continental neighbours, on the contrary, give a marked preference to warm hues, as sepia, umber, bistre, &c.

In the exhibition referred to, our national peculiarities in colour were very marked, and a very useful lesson might have been learned there by those disposed to study it. Not only was an inferiority in colouring observable, but there were other features which perhaps it would not be flattering or pleasing to the vanity of many of our brother artists to particularise. The same mannerism, however, exists in another department of art—in engraving. It is just as easy to recognise an engraving by an English artist amid a crowd of others by foreign artists. There are epochs of style and manner in the history of Art. The present appears to be characterised by the mechanical. In engraving, the mechanical style was educed and fostered by the Annuals; they created a demand for works, to produce which an adequate amount of talent was not forthcoming, therefore its place had to be supplied by mechanical agencies and appliances.

We employ the term "mechanical" in opposition to the "artistic." It must be admitted that in most of our photographic productions, the mechanical element predominates over the artistic. And it must necessarily be so, inasmuch as a knowledge of the principles of Art can only be acquired by long and profound study. Its principles are based on those of science, and cannot be learned or duly estimated without an acquaintance with the latter.

The artist who only looks superficially on Nature, cannot give a faithful transcript of her beauties. Ignorant of the laws of motion, of optics, light, and colour, he falls into error at every step. It may be urged that artists have become eminent and popular without this knowledge, but it may be replied, that ephemeral applause and popularity may be gained by the most meretricious efforts. Enduring fame is seldom the meed of any but those who sound the profoundest deeps of science: witness the intellectual culture of Michael Angelo, Leonardo da Vinci, of Rubens, and Cellini.

The peculiarity of colour in photographs abides with the English artist, to whatever clime he may betake himself. Twenty years' residence in a foreign country does not deprive him of his idiosyncrasy, and whether his productions come from India, Australia, Turkey, or the Pyrenees, the inimitable and unmistakeable British seal is impressed upon them.

Those who still deny to photography the rank of a fine art, would do well to compare pictures of the same object taken by two photographers; supposing one to be a mechanical, and the other an artistic operator. The difference will be striking, and apparently unaccountable, and would be really so, if the art were merely mechanical. But in a crowded gallery of photographs, it is not at all difficult to point out the works of well-known photographers: each has his individuality, strikingly shown in his works; each has his "manner" and "style," as distinctly marked and recognisable as that of the engraver or painter. The truth is, that the camera is but the tool in the hands of the operator, like the crayon or the pencil in the hands of the painter, and its products depend for their excellence upon the skill and intelligence with which the passive tool is guided. Photography, like painting, has its Rembrandts and its Vandykes, its Claudes, Cuyps, Hobbimas, and Gaspar Poussins, in difference of manner or style, at least, if not in genius. This stamp of individuality on the photographer's products is certainly one of the most remarkable features in the art of photography.

A good deal has been said and written upon artistic photography, in which photographers are exhorted to become artists. The recommendation is a good one, but not easily obeyed. "Art is long and life is short," as sings the poet; and it may be said that the artist, like the poet, is born such, not made. He must, doubtless, possess a natural aptness and capability, but, like the poet, he must owe something to culture and discipline. The study of the principles of art is exceedingly difficult, and the appliances are but few. The first and surest step is to make acquaintance with the principles of science. The subjects of chiar-oscuro, composition, and colour, have been elucidated in the pages of this journal. Those who desire to pursue the principles of art further, must make themselves acquainted with the laws of harmonious colouring. A great amount of error is still current on this important matter, notwithstanding that the work of M. Chevreul, who has investigated the subject, is accessible to every one. It requires a very long time to supplant error by truth. In no respect has this fact been more strikingly shown than in the case of M. Chevreul's researches. The subject was nominally engrossed by one or two writers, who, strange to say, never made a single rational observation or experiment in the matter. More recent writers have attempted to graft Chevreul's new fruit upon Field's old stock, and the result is a most incongruous medley. We might as reasonably attempt to teach astronomy by means of Moore's almanack as to teach the laws of colouring by the aid of the lucubrations of Field, Hay, Jones, or Redgrave. Chevreul's treatise requires patient study; unless it be mastered as a *whole*, only confusion and error can attend any attempt at applying its laws. The task is not difficult to the patient inquirer, but like every other scientific topic, it requires *study* to master it. It would scarcely be possible to exhibit a greater mass of ignorance and confusion on any subject than is contained in a "Manual of Colour," published for the use of the students in the Department of Practical Art. There is not the slightest attempt at definition of terms; while those used should have a prescribed meaning, yet they are exchanged indiscriminately: *tone* is used instead of *hue*, and *tint* where *tone* is meant. Take the following passage as a specimen:—"Red, which in colour is intermediate between light and darkness, being the contrast of grey, which holds the same place in colourless media; red also being the most positive of colours, harmonises agreeably with both the neutrals, black and white." This is but dogmatic nonsense, yet a very fair sample of the kind of teaching to which the ignorant are treated in the manual. With no better instruction than is afforded by the above specimen, artists cannot be expected to make much progress in the principles of art. Those who desire information would act wisely in going to the fountain-head for information; abridgments and reviews but mislead the student, inasmuch as Chevreul's work requires more study and attention than superficial inquirers are disposed to bestow upon it.

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* Concluded from vol. iv. p. 170.

The most important portion of the study of colouring consists in that which relates to the law of contrast; in fact, it may be said to include everything relating to the assortment or arrangement of coloured objects. It has been attempted to treat this subject by the rule of thumb—the usual resort of "practical men;" but it is rather an æsthetical subject, and escapes from the limits that are attempted to be imposed upon it.

PHOTOGRAPHIC INK.

M. Disderi has communicated to us the results of experiments he has made with the new solution to which we referred in No. 99. The composition of it is due to M. C. Macaire, who has bestowed upon it the name of photographic ink. It is intended, as we have already intimated, to replace the bath of nitrate of silver for collodion negatives, and for positives on paper.

The baths for collodion, prepared with this new product, have the property of lasting much longer than the ordinary nitrate baths. It exhibits no signs of decomposition under atmospheric influences. The negatives obtained with it are never fogged.

A bath of 140 ounces will sensitise 450 plates, 12 × 10, and is only then given up on account of the quantity of iodide it has absorbed. It may then be employed for strengthening negatives, after being diluted with double its bulk of water.

During a cloudy day, M. Disderi prepared two plates. He placed one in a nitrate bath, and the other in a bath of photographic ink. He then took pictures on them. The first of the plates was completely decomposed; the second, on the contrary, remained perfectly pure.

In sensitiveness, it is fully equal, if not greater, to the old nitrate solution.

It is important to filter the negative bath after the immersion of one or two plates, in order to remove the white precipitate, caused by the presence of iodides. Like the ordinary nitrate bath, the bath of photographic ink acts better after several plates have been sensitised in it.

The negatives are more intense in the blacks, and the lights are more transparent.

Positive paper, sensitised with this new solution, may be kept fifteen or twenty days without deterioration; the only difference of importance being that the salting solution must not contain more than 3 per cent. of chloride of ammonium or sodium, else a precipitate of chloride will take place in the bath.

One of the chief advantages of the photographic ink in positive baths consists in preserving the whites of the image in all their purity. It is important to have special toning and fixing baths.

M. Disderi assures us that positives thus obtained acquire the greatest permanency.

Although the new solution is less costly than nitrate of silver, the difference is not considerable; but as the baths last much longer, and the results are much more certain, it follows that the ink is more economical.

Such are the observations of M. Disderi, to which we may add, that we have seen him operate in very bad weather, during one of those very rainy days that have been so frequent lately. The accomplished photographer took six negatives. The time of exposure did not exceed 20 seconds, notwithstanding the feeble, yellowish light that penetrated through the dripping windows of the operating room.

The portraits obtained under these unfavourable conditions are excellent: we have never seen better. Sharpness, vigour, intensity, and harmony of tone, abundantly prove that the experimentalist had in no respect exaggerated the qualities of the photographic ink. We hope that other artists will study the properties of this new sensitising bath, and communicate to us the results.—*La Lumière.*

GENERAL OBSERVATIONS ON PHOTOGRAPHIC POSITIVES.*

BY MM. DAVANNE AND GIRARD.

IV. *Number of Proofs that can be fixed in the same Bath.*—If, in a solution of hyposulphite of soda, as many proofs as possible are fixed, the time of fixing, which was estimated at ten minutes, becomes increased as the point of saturation is approached; but prudence requires that we should put into the same hypo. bath a quantity of the salts of silver far below that required to saturate it. Now the point of saturation of 100 parts of hyposulphite of soda is 38 of chloride of silver (or its equivalent), which is equal to about eight or nine large sheets, 17 × 22, if they are not previously washed, and double that number if we take the precaution to wash the proofs. In practice, from excess of prudence, perhaps, we have not ventured to exceed four large sheets.

We prepared sixteen quarter sheets, and fixed the sixteen proofs (10 × 8) in a solution of 100 grammes of hyposulphite of soda in 500 grammes of water (solution of 20 per 100). The proofs were first washed in a bath of bicarbonate of soda, then placed, two at a time, in a bath of hypo., where they remained only ten minutes. After being washed and dried, we satisfied ourselves that the whites of the first and the last were perfectly pure, and that both proofs appeared to be exactly alike. The solution of hyposulphite of soda was filtered after this fixing, to remove a slight deposit of carbonate of lime, produced by a little of the bicarbonate of soda; it had a slightly yellow tint, indicating the commencement of decomposition, arising, doubtless, at the moment when the hyposulphite of soda, penetrating the paper, comes in contact with an excess of salts of silver, in spite of every precaution that may be taken. Therefore, a bath that has once served, must not be employed for a fresh lot of proofs, but mixed with the residues.

We may then assert, that 100 grammes of hyposulphite of soda dissolved in 500 parts of water, will suffice to fix successively, but continuously, equal to four whole sheets, even when we omit the first washing in pure water, upon which we insist only from the moment that the nitrate of silver is transformed into an insoluble salt.†

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* Concluded from vol. iv. p. 171.

† We have endeavoured to simplify the fixing still further. In the course of our researches, we have proved that, if some bicarbonate of soda be added direct to a solution of hyposulphite of soda, the nitric acid acts upon the bicarbonate before it decomposes the hyposulphite; on the other hand, and in another series of researches, we have ascertained that the presence of chloride of sodium greatly retards the decomposition of the argentous hyposulphite of soda, even in the presence of light. From this fact we derive the very simple idea of making the following compound bath:—

Water	500 parts.
Bicarbonate of soda	10 ,,
Common salt	25 ,,
Hyposulphite of soda	100 ,,

Filter the solution.

It will be preferable to make this solution beforehand, and filter when used, in order to separate the precipitate of carbonate of lime, which is slowly formed. In the quantity of bath above indicated we have passed sixteen proofs, 8½ × 10½, on removing them from the pressure frame, but we have not met with the same result as when employing two separate baths; the tone of the proof was not so strong; the bath filtered immediately had evidently the same tint as the first. After eight-and-forty hours of repose, it acquired a much deeper hue than the bath of simple hyposulphite; it has then a greater tendency to decompose; its employment is precarious, and must only be sanctioned by practice. It is probable that this difference is due to the action of the carbonic acid which is liberated in the bath.

V. *Washing the Proofs.*—Operators often fall into a double exaggeration with regard to washing fixed proofs; and while some, seeing that the proofs fade, pretend that this fading is due to hyposulphite of soda remaining in the paper, and therefore recommend that the proofs be washed from four-and-twenty to eight-and-forty hours, others, who see fine proofs fade and turn yellow by a prolonged sojourn in the water, assume, on the contrary, that the washing injures the proofs, both in their purity and brilliancy, and that the impurities of common water are the cause of the destruction, and that, consequently, we must operate quickly, and perhaps with distilled water. The experiments we have made greatly simplify the question: they enable us to trace the cause of the exaggerations in opposite directions, and to prescribe an easy and rational washing in practice.

Under ordinary circumstances, it is seldom that proofs fade in consequence of the hypo. being left in the substance of the paper, as is generally supposed; when this cause of fading manifests itself, it appears in round and yellow spots, which grow larger, and destroy the picture. This destruction is effected in a very short time, sometimes in a few weeks, or even days, after fixing. But when the image is wholly destroyed, passing gradually to yellow in an indefinite space of time, according to the dryness of the atmosphere in which it is placed, it is due to a fixing made in hyposulphite of soda in a state of decomposition, and, in that case, prolonged washing only hastens the decomposition.

On the other hand, we are satisfied that prolonged immersion in ordinary water does not injure the proofs; for we have taken positives, cut them in two, and washed one half for three hours, and the other for eight-and-forty hours, and there was no difference between them. Experience proves that we must no longer attribute an injurious influence to the quality of the water—that is, with ordinary river or rain water; for we have not found the slightest difference between one half of a proof washed in river water for three hours, and another half left for eight-and-forty hours in very hard well-water, to which was added sufficient chloride of sodium to impart a salt taste. In this case the whites were slightly tinted. Four-and-twenty hours' immersion in water may exercise an injurious action on the pulp of the paper, but it will not injure the proof so much as when it is toned or fixed in a sulphurous bath; in this case, the water acts in a few hours as the atmospheric humidity acts in a much more prolonged time, and it hastens the fading, which would have taken place only in the lapse of time.

The washing can therefore be very simply effected, if the proofs have been well fixed. Excess is not to be condemned, but it is useless, and should be limited to removing the hyposulphite of soda.

As a general rule, dishes about four inches in depth should be used, and filled with water, which should be renewed every half hour; after the sixth water we may be sure of a complete washing; but we may make quite sure that it is completed by a very simple method, first suggested by M. Bayard. Every photographer has at hand a test, of exquisite sensibility, for hyposulphite of soda: this is nitrate of silver. Water, containing five millionths of its weight of hyposulphite of soda, if tested with a crystal of nitrate of silver, exhibits in two or three minutes the characteristic yellow stain of sulphide of silver.

The most convenient way of employing this test, is to lift a proof out of the bath when it is supposed to be sufficiently washed, and to allow a few of the last drops that drain from it to fall into a *white* porcelain capsule, or any other vessel with a white bottom, and to throw into it, without stirring, a fragment of nitrate of silver of the size of a pin's head. If the yellow stain does not make its appearance in a few moments at the bottom of the capsule, or if this spot is not very evident, it will be sufficient to give the proof another washing as a further precaution; if, however, the spot shows itself immediately, and rapidly changes to red and then to black, two or three more washings will be necessary.

Apart from *toning*, which we do not now take into consideration, we think that hyposulphite of soda, employed as now recommended, will be without danger to the permanence of the proofs, and that they may be kept for an indefinite space of time, if protected from atmospheric influences.

[In the formula given on page 170, instead of "chloride of soda," read "chloride of sodium."]

SCIENTIFIC GOSSIP.

A most interesting application of some very elaborate and abstruse researches in physical optics has recently been made by M. Gassiot. It has long been a desideratum to obtain a source of light without heat. Irrespective of the great advantages of such a discovery to the photographer, its value would be almost inestimable in many other branches of science. The surgeon, for instance, has hitherto been compelled to perform many operations—upon which the health, perhaps the life, of his patient depends—almost in the dark; whilst the saving of life which would necessarily follow the introduction of such a safe means of illumination in our coal-mines, would be incalculable. M. Gassiot has, we fancy, at last succeeded in solving the problem, and that by an application of some of the most recondite and, to the mere utilitarian, apparently useless, investigations ever commenced by scientific man. It has long been known that, under certain circumstances, the electric discharge from a voltaic battery can be made to traverse short distances across air in the form of an intensely luminous, but, at the same time, intensely hot, spark. If this discharge is made to pass through a glass tube, by means of platinum wires sealed into the extremities—the air having previously been exhausted from it by means of an air-pump—the discharge assumes an entirely different aspect. Instead of appearing in the form of disconnected sparks, the electric fluid traverses it like a continuous stream of nebulous light, filling the tube with a beautiful phosphorescent glow, whilst the heat almost disappears: on this account it was, until very recently, considered that a vacuum conducted electricity. Recent researches have, however, shown, that a vacuum really is a non-conductor to the passage of the electric fluid; and that the phenomena of conduction apparent in the "vacuum tube" was really due to the great conducting power possessed by a highly rarefied gas. As soon as this was known, it became a matter of great interest to philosophers to ascertain the various effects which would be produced by having the tubes filled with different sorts of gases, and also what difference was caused by alterations in the size or shape of the vacuum tubes employed. Amongst these experimentalists, M. Gassiot occupied one of the first positions; and, as an adaptation of some of his researches to the wants of every-day life, he has given to the world a ready and simple means of applying the electrical discharge from the induction coil to the purposes of illumination. A carbonic acid vacuum tube (that is, a tube filled with carbonic acid, which is then exhausted from it by means of an air-pump, until there is only the most infinitesimal trace of gas remaining), having an internal diameter of about $\frac{1}{16}$th of an inch, is wound in the form of a flattened spiral; to the ends of the tubes are attached two wider tubes, into which platinum wires are sealed: they are inclosed in a wooden case, so as to permit only the spiral to be exposed. When the discharge from a Ruhmkorff's induction apparatus is passed through the vacuum tube, the spiral becomes intensely luminous, exhibiting a brilliant white light. M. Gassiot, who exhibited the instrument in action at a recent meeting of the Royal Society, caused the discharge to pass through two miles of copper wire, showing that it would be applicable to illumination at a distance. The results were brilliant in the extreme; and we confidently predict that this beautiful contribution of abstract science to every-day life will very shortly be one of the most useful and popular forms of the electric light.

An improvement in the construction of stereoscopes has recently been the subject of a patent. The pictures are arranged in a long chain, back to back, so that one is upright whilst the other is upside down. They are then brought before the eyeglasses by means of a skeleton wheel, which admits of exhibiting the pictures as they arrive at the proper positions. When the slides pass over this wheel, they arrange themselves on the bottom of the box in the same order in which they were first introduced into the box, and by raising a sliding partition in the box, and pushing the pile of pictures from one side of the box to the other, the chain of pictures is ready to exhibit its other side. We must confess we are at a loss to conceive what could have been the object of the inventor of this device in patenting it. In no way is it better than the old plan of arranging the pictures on an endless band; and we think, in some cases, it would be worse, as the pictures being back to back precludes the possibility of exhibiting glass stereographs. There seems to be a decided mania amongst some persons to take out a patent; but we have seldom seen an idea patented in which the absence of originality was so painfully apparent as in the one before us.

In a recent Gossip, we gave an account of some experiments made by Professor Sanders upon collodion and dry plates, in which it was shown that tincture of turmeric added to collodion would render collodion intense. He now states that almost any organic substance will answer that purpose more or less perfectly, and that the tincture of almost any root will at once give this intensifying property to collodion. The professor states that glycyrrhizine or tincture of liquorice-root, which has been long used for this purpose, will affect collodion in this manner, but not to any greater extent than the tincture of any root which gives up organic matter to collodion. Here we must differ. Mr. Hardwich, before he gave to the photographic world his glycyrrhizine intensifying process, had been long occupied in making elaborate experiments on this subject, and it was only after having tested glycyrrhizine against hundreds of similar bodies that he definitively settled upon this substance as the one to be recommended. Furthermore, it is of consequence to the proper working of collodion, so intensified, that the glycyrrhizine should be in a tolerable state of purity; a mere tincture of liquorice-root, such as the professor speaks of, will not answer the purpose. We cannot help thinking that had Professor Sanders experimented with a pure sample of liquorice-sugar he would not have asserted that the alcoholic extract from almost any root would answer as well.

PHOTOGRAPHY IN PERU.

MM. Colpaert and Garreaud, who are now on a mission in Peru, have sent to Paris a series of proofs taken at Ariquipa and its environs. These enterprising artists are now, at the present date, crossing the Andes, and operating in places situated upwards of 13,000 feet above the level of the sea. The proofs were accompanied by the following interesting remarks:—

"The city of Peru, situated about 7,800 feet above the sea level, is, from its position, on the boundary line between the Sierra and the Pacific coast; consequently, it enjoys the temperature of both those regions. In this country the rains generally continue from ten to thirteen weeks—from January till March; in the month of February it falls in torrents; from March to the end of April the sky is always cloudy; but from this date till the month of December the atmosphere is enchantingly clear, and the sky of splendid purity.

"During the hot months the degree of dryness is incredible. The furniture in the houses cracks and falls to pieces; the photographic cameras and frames twist and crack; the humidity of the sensitised collodioned plate is sufficient to unhinge the back of the slide, as occurred several times, whereby the collodion film became torn. To obviate this inconvenience, we have lined each frame back with flannel, kept moist; but even this precaution was insufficient to prevent the accident described above.

"The collodion dries upon the plate instantly; and it is necessary to lay the glass upon a piece of wet flannel in order to keep it cool, so as to get sufficient time to focus and expose—about two or three minutes; this space of time being sometimes exceeded, we have had recourse to another simple and successful expedient. It consists in applying to the back of the glass plate a piece of slate of the same size, covered with a piece of cloth moistened with water. In this manner the slate is kept cool, by the evaporation of the water, for upwards of ten minutes, in the hottest weather. Besides, the bellows of the camera was kept covered with wet cloths; and, in this manner, we obtained proofs in six or seven seconds, and sometimes instantaneously.

"In the hot season, hyposulphite of soda and sulphate of iron, in the open air, and out of the sun, entirely lose their water of crystallisation in three or four days, and crumble to powder between the fingers like slaked lime.

"Of all collodions, the following has been the most successful:—

COLLODION WITH IODIDE OF AMMONIUM.

7 grammes of two or three different kinds of gun-cotton.
450 grammes of ether at 62°.
500 grammes of alcohol at 40°.

As soon as the heat is lowered a few degrees, we mix the alcohol and ether in equal portions.

"Development with protosulphate of iron succeeded better at Ariquipa than at Lima, because, probably, this latter city enjoys a more humid atmosphere on account of its proximity to the sea, and because it is situated only a few yards above its level. On the other hand, we experienced an inconvenience at Ariquipa which did not present itself at Lima. Whenever we developed a negative, hundreds of little white holes made their appearance; we do not know what to attribute them to, and we have not yet been able to remedy them. All these little holes print as black spots on the positives.

"We thought, at first, that the silver bath had absorbed a portion of the iodide of ammonium, in consequence of the immersion of several collodioned plates in it; but, since we have found that a new bath produces exactly the same effect, we are obliged to attribute the annoyance either to the collodion, or to our mode of developing. Yet, as to the collodion, we do not think it can be over-iodised, seeing that we only add 6 per 1,000 of iodide; and, as to the development, we employ Count Aguado's formula. We have frequently tried to develop with pyrogallic acid, but always without success."

CELESTIAL PHOTOGRAPHY.

REPORT ON THE CORONA OF THE TOTAL ECLIPSE OF THE SUN ON JULY 18, 1860.

BY M. FOUCAULT.

An ordinary camera-obscura provided with a double lens of large aperture and short focus was mounted equatorially. It gave a very brilliant solar image on the ground-glass screen. A finder was attached to the apparatus, and it was moved by a screw with the hand; so that by keeping the sun on the crossed threads of the eye-piece, we might be sure of keeping the image fixed on the screen. It was, therefore, only necessary to substitute recently-prepared and sensitised collodioned-plates for the ground glass, and submit them for a variable time to the actual image of the eclipsed luminary. Immediately after the disappearance of the last ray of direct light, we placed the first plate in the focus, and exposed it for ten seconds. Then it was replaced by another, which was exposed twenty seconds; and finally, a third, which remained 60 seconds. The plates were developed and fixed with sulphate of iron and cyanide of potassium, with the view of obtaining *direct positives*. In the hurry of operating, the frame containing the first plate was disturbed after the cap was removed; the result was the accidental formation of several images in a very short space of time, which supplied the elements of an unexpected and valuable discussion. On the three plates we obtained six distinct images, three of which were formed in a space of time not exceeding a quarter of a second, and the three others resulted from exposures which continued 10, 20, and 60 seconds. The three images formed in a fraction of a second at the moment when the sun disappeared, did not exhibit a complete representation of the aureola; they were reduced to a circumference of the circle surrounding the obscure disc of the moon, and exhibited variations in intensity, which being produced three times cannot be attributed to accidents in preparation. On the side upon which the interior contact took place, this circular contact prevented a greater intensity, which authenticates and confirms the impression noticed by M. Le Verrier. We also remark upon these three images irregularities similarly situated, which appear to be an exaggerated representation of the irregularities of the lunar contour. When the proof is placed in the actual position of the luminaries, we discover that among these irregularities, the two principal ones are contiguous, and situated at the lower and eastern extremity of a diameter inclined at an angle of 45°. The three other proofs show an extension of the aureola, which increased with the length of the exposure. This aureola diminished in proportion to its removal from the planet, and became lost without line of demarcation in the background, which represents the sky. In the proof exposed 60 seconds, the aureola extends palpably to a distance equal to three times the radius of the central disc. But in certain particular directions, the aureola exhibited positive and negative variations in intensity, which appeared like the rays of a glory; one of them, more conspicuous than the others, was prolonged in all the proofs beyond the rest of the aureola, and appeared to emanate exactly from the point occupied by the irregularities before-mentioned on the edge of the moon. Such are the facts resulting from an experiment undertaken solely to appreciate the photogenic action of the aureola on wet collodion.

The identity prevailing in the six proofs furnishes positive elements for the discussion of the nature of the aureola, which I shall endeavour to turn to account.

If the aureola belongs to the sun, why that rapid diminution of intensity commencing at the dark edge of the moon? why those rays, the distribution of which seems connected with the inequalities of the contour of our satellite? If it belongs to the moon, how happens it that in no other circumstances can we perceive the least trace of the presence of an atmosphere? If we seek the cause in our own atmosphere, how comes it prolonged to render this aureola adherent even to the edge of the moon?

But, on the other hand, why persist in making a real object of the aureola? We know that in virtue of the fundamental principles of the theory of undulations, light does not necessarily propagate in a straight line; that in passing near the limit of the body, it passes round the obstacle, and is disseminated in variable and rapidly decreasing proportions in the interior of the geometrical shadow. It is true that this light distracted in the shadow is always extremely feeble, and that to perceive it recourse must be had to particular precautions. But, in the case of a total eclipse, the entire sun being taken for the sole source of light, and the moon as a screen, the distance, and the constituent planetary vacuum, for the manifestation of the diffusion of the light in the shadow, we have a union of circumstances so favourable, that there is ground for inquiring if the aureola be not a phenomenon of diffraction. If it were thus, the rays with which it is embellished are specially explained by the asperities of the contours of the moon, and we escape the embarrassment of not knowing where to place a diffusive atmosphere. As to the reddish appendages, we do not know whether they can be accounted for by the simple laws of diffraction; but as they spread much less than the aureola, as their distribution allows us to perceive no known relation with the configuration of the profile of the moon, we have really no reason to dispute their actual existence. Let us leave, then, *for a more extended examination*, the protuberances of the sun, the aureola to the pure space where the diffraction operates, and attribute to the influence of our own atmosphere the beautiful copper-tints with which the whole horizon is coloured at the moment when the observer is immersed in the shadowy cone.

M. Le Verrier's mission was to measure the position of the protuberances, with the view of ascertaining whether they belong to the sun or to the moon, and for this purpose the instruments were supplied with special micrometers. It happened that the observers, MM. Villarceau and Chacornac, both observed the same protuberance, which is not to be regretted, because there resulted a verification of the important fact, that they identified it in the clearest manner.

The protuberance examined was situated about 30° east of the northern meridian: now the measures of this angle of position show that it increased—

From 3°, 5′ in 2 m. 0 sec., according to M. Villarceau.

From 10°, 7′ in 6 m. 11 sec., according to M. Chacornac.

The long duration of the observation reported by M. Chacornac arises from the fact, that this astronomer continued to observe the protuberance 3 m. 23 sec. after the end of the total eclipse. It must be remarked that this was not a vague glance, but an exact measurement made a long while after the reappearance of the direct light of the sun. And it will acquire a new interest when we remark that, doubtless, the visibility of the protuberance becomes impossible only at the moment when it is invaded by the extremity of increasing luminosity.

The change in the angle of position of the protuberance in relation to the disc of the moon, amounted to about two degrees a minute; it agrees exactly with the hypothesis that the protuberance belongs to the sun's disc, it being included in the motion of that luminary. The measure of the motion of a second spot (?) leads to the same result.

It has become, therefore, an undoubted fact that the red protuberances belong to the sun. They are an accidental emanation of that red gaseous and transparent envelope which appears to cover the entire surface of the sun to 8 or 10 seconds of height. Without doubt they are due to the perturbations which give rise to the appearance of spots, and have an intimate connection with them.

THE ECLIPSE OF THE SUN.*

Previously to leaving London, trials had been made to obtain photographs of the moon with the Kew instrument, merely, however, for the purpose of judging of the time that might be necessary for the pictures of the corona, supposing it to be as bright as the moon, but not the slightest impression could be obtained by an exposure of one minute, whereas the pictures we have obtained of the luminous protuberances are all over exposed, and the corona has clearly shown itself, so that the latter must be brighter than the light of the full moon.

The plates being only 6 inches square, while the sun's image is 4 inches in diameter, it will be seen that only a small extent of the corona could be depicted. I mention this in order that there may be no misconception on this point; had I desired to make photographs of the whole of the corona, I should have adopted a totally different arrangement.

My hand drawings were made by the aid of a series of lines ruled on glass, and placed in the focus of the eye-piece. This could be rotated through an arc of 90°, and I had two diagrams with similar lines set out on my drawing paper. With these aids I was able rapidly to make some measurements of the position and extent of the prominences, and to complete two drawings. On comparing my sketches with the photographs, I was pleased to find that each completely confirmed the accuracy of the other.

My drawings were made in reference to the vertex, but it will be better to describe the markings as they were shown in the photographs in relation to a circle of declination. If the reader will suppose a circle to be divided into four quadrants by drawing two diameters across its centre at right angles, and that one of these diameters is made to coincide with a line drawn through the centre of the sun and the pole, calling the quadrants north-east, south-east, south-west, and north-west respectively, then the edge of the moon, both in the north-east and south-east quadrants, was at the commencement of totality nearly covered with the luminous prominences which extended over an arc of 130° beyond her dark limb. These prominences were extremely brilliant, and far more so than the corona; they were not uniform in tint, and, with few exceptions, they did not present any colour approaching to red or rose; two had, however, a decided but faint rose tint. The surface of the luminous prominences next to the moon was, when first seen, very irregular, and far more so than was attributable to mountains as seen in profile on the moon's edge. This irregular outline may, however, be explained by supposing the prominences to have been first seen floating like clouds in a transparent atmosphere at some little distance from the sun's surface, and consequently from the moon's edge—a supposition which is supported by the fact that one such prominence or luminous cloud was seen distinctly detached, and at some distance from the dark moon.

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* Concluded from vol. iv. p. 175.

At the commencement of the eclipse only one small mountain-like peak was to be seen in the north-west quadrant, and a curved one in the south-west quadrant. As the moon glided over the sun's disc, the inner outline of the prominences in the eastern hemisphere became less and less indented, and at last they were bounded by the nearly even outline of the moon's limb. As the eastern prominences became gradually covered, the mountain-like peak, seen at first as a mere point in the north-west quadrant, gradually grew in dimensions, then presented several points, and at last resembled somewhat a colossal ship in full sail; and extending from this through an arc of 60°, there came into view, in the north-west quadrant, a long streak of luminous prominences, varying in breadth, and with a few points projecting outwards. This streak became very jagged in its inner outline as the moon glided off from it, just previous to the sun's reappearance—these luminous prominences presenting the same phenomena as those on the eastern edge; that is, appearing like clouds floating in a transparent atmosphere, a little distance from the sun.

It will render the detailed description I now propose to give of the several luminous protuberances, as measured in the photographs, more clear if the reader will provide himself with a circle divided into 360° and number the degrees in the reverse order of the figures on a watch—namely, from right to left.

Placing 360, which represents the north point (not the vertex) uppermost, the east point, or 90°, will be at the left; 180° or the south point, at the bottom; and 270°, the west point, at the right hand. Eastward from the north point there was conspicuously visible a brilliant prominence, the summit of which, as the moon glided along, was seen to curve in two opposite directions from a radial line, the curved portions being far less brilliant than the stem, which touched the moon's limb throughout the totality. The centre of the stem was 28° from the north point, and it was about one minute of arc broad (28,000 miles nearly). It extended fully 1½ minutes, or 42,000 miles, beyond the moon's limb. This protuberance was so brilliant that I perceived it several minutes before the totality, and it must, without doubt, have been seen by all observers provided with good telescopes. It may therefore be conveniently made a starting-point to which all protuberances of which I shall speak may be referred by those astronomers who observed the prominences in regard to the vertex, by taking into account the angular distances of the several prominences from this one.

At 57° was situated the northern extremity of a remarkable detached curved cloud, which, when first seen, was about half a minute (14,000 miles) beyond the position occupied by the moon's dark limb. It presented a double curvature on its northern side, both curvatures being convex towards the north. It inclined in a curved direction at about an angle of 60° from a radius towards the east, and was a minute and a half (42,000 miles) long. As the moon glided onwards in her course she approached it gradually, and at last touched the extreme point of this floating cloud, which glowed with all the brilliancy of one of our own terrestrial clouds at sunset. It presented a decided rose tint.

At 72° from the north, a protuberance, in shape reminding one of a boomerang, imprinted itself on the sensitive plate, although it was not visible to me in the telescope. The stem was 2 minutes long (56,000 miles), the point was bent towards the north, inclining downwards over towards the extremity of the detached cloud. Midway down the stem was a branch curving upwards, so that, on close scrutiny, the boomerang protuberance was not unlike the capital letter G in ordinary writing. It is a very curious circumstance that this protuberance imprinted itself distinctly, although it did not attract the eye directed especially to that locality. This may be accounted for on the supposition that it emitted a feeble purple light.

Between the last-named protuberances (the floating cloud and the boomerang) there was a low and long luminous streak, not more than a quarter of a minute broad, and extending in length about 8° along the moon's limb.

From the stem of the boomerang, extending from 72° to 135°, there was a long streak of luminous cloud, commencing with the thinnest possible streak near the boomerang, and then becoming broader, but in no part exceeding a quarter of a minute in breadth, until it reached the position of 111°, when a skittle-like thickening took place, half a minute broad in the broadest part. Projecting from the commencement of this skittle were some faint projections which imprinted themselves on the sensitive plate, but I did not see them in the telescope. From 129° to 130° there was a considerable enlargement of the streak, which widened out to fully one minute in breadth (28,000 miles). This was bounded by curved lines, and was extremely brilliant. Just in the neighbourhood of this thickening—namely, between 115° and 140°, the corona was very bright, and one of the long streamers was to be seen curving towards the north.

At 154° a protuberance, curving northwards, and not unlike a bishop's mitre, existed, which extended from the moon's limb, a distance of 1·5 minutes (42,000 miles); it was very much fainter towards the point than near the stem. A very faint streak of light connected the mitre-like protuberance with the long streak.

The long streak and nearly all the mitre-shaped protuberance were covered by the moon before the totality ended; but the floating cloud and the first-named northern protuberance were visible during the whole time.

At the commencement of the totality only two protuberances were visible in the western half of the moon's disc, namely, following the order of the preceding description; one, the centre of which was situated at 191°, consisted of a thin streak less than a quarter of a minute broad, and extended over an arc of 5½° on the moon's limb or 197°, a point curving towards the south, projected about half a minute. This projection was completely covered as the moon advanced. The other projection was the mountain-like peak, the centre of which was situated at 348°. This peak, at first not more than ¼ minute high, grew to considerable dimensions as the moon glided away from it, and assumed, as was before said, the appearance of a ship in full sail, the summit, or mainmast, extending more than 1½ minutes, and the case or hull of the vessel measuring 10° on the moon's limb.

As the moon glided on there came into view a long streak extending from 280° to 340°, where it just touched the hull of the ship. This streak was in some parts a mere line, and bounded by curved lines both on the under and upper side. It thickened to about ½ minute between 300° and 310°, at both of which places two short horn-like projections were to be seen.

At 263° and 278° there came into view two small projections, one extending ½ minute, and the second ¼ minute, from the moon's disc.

THE PRESERVATION OF POSITIVE PAPER.

BY M. A. GAUDIN.

The preparation of positive paper usually consists in floating salted paper on a strong solution of nitrate of silver, and then allowing the paper to dry, suspended in a dark place. Paper prepared in this manner can be used advantageously only within a few days after it is sensitised, because the nitrate of silver, in excess on the sensitised surface, is an element of reaction, which produces its effect, after a time, even in obscurity. Contrary to what takes place with collodion, where the exposure to light is limited to an elementary molecular disturbance, in chloride of silver-paper submitted to the direct action of the solar rays during a long period of time, there is a complete molecular transformation, which is greatly facilitated by the presence of nitrate of silver in excess.

In completely removing this excess of nitrate of silver, the paper is sure to lose much of its sensibility, and its primitive hue under the action of the solar rays will not be so deep; but with a little longer exposure, and certain manipulations in the toning, we may arrive at the same result as at first; and there will be the additional advantage of being able to use paper which has been prepared a long time, and which, when washed in hyposulphite of soda, will yield no nitrate of silver to produce sulphide of silver, or compounds derived from the hypo., which are so detrimental to the permanency of the proofs.

The process I propose consists in putting the proofs, upon their removal from the pressure-frame, to soak in salt water. The solution must be very weak; 1 to 2 per cent. is sufficient; for, strictly, the water can act only by effecting the combination of the salt in excess, or the reverse of the proof with the nitrate of silver on the sensitised side.

After soaking for several hours in the salt water, it is sufficient to rinse the proofs in ordinary water before they are put to dry.

The Photographic Tourist.

A STROLL ON THE BANKS OF THE THAMES.*

Down the steep pathway, through a fragrant meadow, whence the thick hay has just been gathered, and we reach the river bank. Let me suppose that we are favoured with fine weather—a wild supposition during such a season as this; but the business of a photographer is to look on the "bright side" of things. It is, then, a glowing summer morning; a thin mist in the valley struggles in vain against the sunbeams, and the lightest of light airs toys delicately with the blossoms of the lilac and the laburnum in the pleasant river gardens. Lazy weather; hardly a ripple on the sluggish tide; hardly a sound in the air, except the hum of insects. Half-a-dozen boats lie together with their noses out of the water. A few boatmen lounge about promiscuously in irregular attitudes. Some smoke, others sleep, none even pretend to have any sort of work to occupy them. One of these watermen, describing an acute angle with a friendly railing, lifts his head out of his arms as we pass by, and dreamily suggests, "Boat, sir?" We of course decline, and he relapses into torpor. Are these boatmen unable to read, or is their tendency to sleep constitutional?

What is understood by a boat at Richmond, would be of no use to the photographer, except as a conveyance; but I think a good, old-fashioned fishing punt, heavy and square, might be employed with advantage in taking views which cannot be satisfactorily obtained from the shore. At low water, or when there is very little tide, two good grapnels will keep the punt steady, and if you find some difficulty in manipulation it will be amply repaid by the freedom from intrusive lookers-on, holiday-makers, and other objectionable persons.

In the present instance, however, we will keep to the banks. The walk is charming. A footpath through the meadows follows the course of the river, leading you into the midst of a mass of tall trees, very old and shady. A footpath diverges to the left, and leads to an old-fashioned mansion, which stands cold, and stately, and silent in the midst of the trees. This is Ham House, the property of the Dysart family. There is nothing, so far as I am aware, in the history of the house to account for the peculiar melancholy which hangs about it. I have no reason to believe that it is haunted; no fearful family legend is told about it; no terrible crime has given it a painful notoriety. Among its historical associations the chief seems to be that it was the birthplace of the Duke of Argyle and Greenwich, and was the favourite residence of the celebrated Duchess of Lauderdale. In conformity with that curious and vain sentimentalism which tries to cheat time and death, we are told that her room remains as it was when she last entered it: her cane lies beside her chair, and her writing table before it. Ham House is an example of the fantastic kind of architecture which prevailed during the 17th century, and is easily recognised by a number of busts in niches, which adorn the front of the house and the garden walls.

The old house has nothing inviting about it except its cool shade and quietness. I think it would photograph well, if you care to carry away such subjects with you. The wood before it is occasionally made the scene of a picnic by people who are too indolent, or too social, to seek a more retired locality. Passing on through the shade into an open meadow, and following the winding of the river, we approach "Twit'nam Meads," rendered famous in the last century as the dwelling-place of Horace Walpole, Pope, and other celebrities.

All that remains of Pope, at Twickenham, is his grave, his grotto, and his reputation. The "Tusculum," which he built out of the profits of his "Homer"—it is a profound mystery how authors *could* have been paid so well in those remote times—was pulled down by a sensible lady, who did not like an inconvenient house, even though the inconvenience might be due to the whims of a great poet. The grotto, which formed the entrance to the garden, has been suffered to remain, and a new house has been built close beside it. This modern erection will attract the notice, if not the admiration, of every stroller on the banks of the river. Its style is composite, and indefinite; and if I were to apportion even a small part of it to any known order of architecture, I feel that I should utterly forfeit the confidence of the reader. It displays a luxury of carving and colour not often—happily—to be witnessed in this country. If you are a bold man you may take a picture of it: there is ample space on the opposite bank to place your camera, but I cannot attempt to predict the result.

Very agreeable villas these, with their trim gardens and rich, green turf sloping down to the margin of the river. Put two or three children in one of the gardens, and the picture is complete. There is nothing prettier or pleasanter of the kind in England. As the sun goes down, the water becomes alive with boats, for a pull on the river is the favourite recipe, in these parts, for getting an appetite for dinner. Here is a crew, edged with blue, from the boat to the tassel of the coxswain's cap. It looks silly, but no matter; here comes another crew in red, to keep them in countenance, or perhaps to blush for them. There goes a crew of business-like young fellows in shirt sleeves. Here is a sulky in stripes; he is nearly swamped in the *mêlée*, but calm and vigorous, with three strokes, he reaches the bank, bales out, and proceeds leisurely on his way. *Place aux dames;* hey, hillo! in front there! Two fair damsels in bird's-nest hats, and—yes, positively in "guernseys," are pulling their papa and mamma up the stream; no light weight, if we may judge from appearances. Is papa steering? If so, why is he getting them into that crowd of boats? Here comes a four-oar recklessly down the stream, and will be into them in one minute. We stretch our eyes anxiously and expect to hear a shrill scream announcing the catastrophe. But no; the four-oar has pulled up short, the other boats somehow glide out of the way, and we see the bird's-nests forging steadily a-head, without once deigning to look round.

The village of Twickenham contains some old-fashioned houses, and some streets of those peculiar, shabby-genteel villas, with stone fronts and brick behinds, and exactly twelve square yards of garden each, which are the outward expression of the spirit of vain show pervading modern English society. The village also contains a number of public-houses, one church, and numerous fancy shops. For the rest it has nearly, though not entirely, lost its literary reputation—one or two names not unknown to literature and science are still to be found among its inhabitants.

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* Continued from vol. iv. p. 177

Few things are absolutely impossible, and therefore I presume that there may yet exist some admirers of Horace Walpole. Any such persons may cross the river at Twickenham and walk up to Strawberry Hill, and may even take a view, if they think proper, of that elaborate monument to Vanity. We, however, will betray our want of taste by keeping along the bank till we reach Teddington Lock. Here is a rather pretty scene, which the camera will copy satisfactorily in judicious hands. You may, if you please, walk on further, on the same side of the river, but in that case you will presently find yourself driven into the Kingston Road, which is hot, dusty, and disagreeable. It will be better, therefore, to cross at Teddington, especially as there is nothing more substantial than ginger-beer to be obtained at the Lock house. Crossing the ferry we are attracted by an inn, but, as it appears to be infested by anglers, we pass on.

Happy fellows these Thames anglers should be. A curious variety of tackle is manufactured and sold at remunerative prices for their especial gratification; inns are built for their express accommodation; books, more or less silly, are written for their exclusive reading; yet somehow they don't seem to appreciate the advantages they possess. You find them stationed, two or three to a punt, at intervals up the river. Their general aspect is that of profound melancholy. What have these people done that they should be compelled to sit all day in solemn silence, watching a bit of coloured wood with a quill in it? What is the meaning of a punishment which appears to be the most ingenious refinement of cruelty? Do they suffer all this by way of retribution for the lingering torture they have inflicted upon the wretched worms which wriggle upon their hooks? I cannot tell; but this much is certain, that they look, in most instances, as if they had an intolerable burden on their consciences. Do they ever catch anything? As far as my observation goes, such a thing, though not in itself impossible, is very improbable. During my long and leisurely walk up this part of the Thames, I never saw anything like a fish, nor an angler who was able to say that he had caught one. I did, on one occasion, see a rather stout gentleman roused suddenly from a state of coma, jerk up his rod, and, finding that his bait was gone, assert that he had had a bite. The circumstantial evidence in this case I admit was strong, but there was no actual demonstration.

To return, however, to Teddington. Passing up the lane and beside the queer little church, you enter the main street of this pleasant, old-fashioned village. Here is at least one good inn, and possibly more; and fresh fruit, which is *not* brought from Covent Garden—as is the case in some rural districts with which I am acquainted—may be had at the little greengrocer's shop. The old village of Teddington is not yet swallowed up in modern brick; hence it is a spot where a traveller of experience will probably "put up."

Ten minutes' walk from our inn are the gates of Bushy Park, where, if we care for bits of foliage, and effects of light and shade, we may find a day's profitable occupation with the camera. The park is especially charming in spring time, when the numerous hawthorns, from which it is said to have derived its name, and the trees composing the magnificent chestnut avenue, are in bloom. This avenue—one of the benefits which Dutch William conferred upon this country—extends in a straight line for upwards of a mile.

Emerging from Bushy Park, we find ourselves opposite to the Lion's Gate of Hampton Court Palace, whence we get into the gardens, so trimly kept, and so radiant with flowers, which have also remained untouched since the alterations by William III. Down to the river banks, from whence several pretty little views may be obtained. At Thames Ditton—a picture of which we should advise you to take away with you—is a ferry, and you may prudently cross over and pass the night, for Hampton Court requires a day to itself.

At Kent's Inn at Thames Ditton, the traveller will get very good accommodation; and the Swan, which, in former years, was one of the pleasantest and best of riverside inns, either is, or soon will be, re-opened. From the river a pleasant country lane leads you round by East Moulsey, whence you may cross over the old bridge to Hampton Court. The views to be obtained from this bridge, both up and down stream, are full of beauty. The river bears on its bosom a number of pleasant islets, and trees rich in foliage bend, as if in protection, over the stream which waters them. A view of the bridge itself, looking either up or down the river, makes a very good picture.

Moulsey is full of inns, taverns, and eating-houses, whose business it is to minister to the wants of the many visitors to Hampton Court. This venerable pile, with its historic interest, its treasures of art, and the surrounding charms of nature, contains an *ensemble* of attraction which is not to be equalled in England. This is the people's palace, and the people have reason to congratulate themselves that such a place is freely opened to them. In the old quadrangles, the gardens, the courts, various subjects may be selected for photographing; and views of the exterior of the palace may be obtained from the barrack-yard, and from the opposite bank of the river.

(*To be continued.*)

A Catechism of Chemistry.

HEAT—(*continued.*)

Q. What is meant by the radiation of heat?

A. Heat is *radiated* from all bodies which are of a higher temperature than the surrounding media in straight lines, and with a velocity equal to that of light itself.

Q. What properties has heat of this character?

A. Radiant heat follows the same laws as light, and, like all radiant forces, it diminishes in intensity according to the inverse ratio of the square of the distance which it traverses.

Q. Can radiant heat communicate heat to other bodies?

A. If the substances are such that they are transparent, radiant heat passes through them without sensibly raising their temperature. If, on the other hand, the bodies are opaque, or offer obstruction to the passage of radiant heat, the latter is absorbed and becomes sensible heat.

Q. Give an illustration of this.

A. A test-tube full of ether placed in the focus of a burning-glass will allow the concentrated rays of the sun to pass through it without the temperature of the liquid being raised to any sensible extent, but if a piece of charcoal be dropped into the liquid, so as to offer some obstruction to the rays of radiant heat, the ether rapidly acquires a high temperature, and enters into ebullition.

Q. In what manner does heat pass from the sun to the earth?

A. By radiation. The heat of a fire also passes across the atmosphere to a person opposite to it in the same manner. The temperature of the air across which the heat from the fire radiates may be below the freezing point, and yet the heat will traverse it and communicate warmth to the person opposite the fire without the temperature of the intermediate air being raised in the slightest degree.

Q. Since radiant heat has been said above to possess the same properties and to be governed by the same laws as light, is it capable of being reflected by mirrors?

A. It can. Polished metallic surfaces reflect radiant heat in the same manner as they reflect light.

Q. How can this be strikingly illustrated?

A. If two parabolic mirrors be placed opposite to each other, rays of heat which emanate from the focus of one of these mirrors will be reflected in parallel lines from its surface, and when they reach, the other mirror will be reflected again from it, and will converge to a focus. The two mirrors may be twenty or thirty feet apart, and a red-hot iron ball placed in the focus of one of them will cause sufficient heat to be reflected to the other mirror as to ignite gunpowder placed in its focus.

Q. Will heat be reflected in this manner from bodies which are of a lower temperature than that required to render them self-luminous?

A. Yes; the heat from boiling water may be reflected in the same manner. If a canister of boiling water be substituted for the red-hot ball in the experiment mentioned above, the heat from it will be equally reflected, and may be rendered evident by holding a thermometer in the focus of the second mirror.

Section II.—Inorganic Chemistry.

Chemical Nomenclature.

Q. What are the general principles of chemical nomenclature?

A. The object which the inventors of the current chemical language had in view, was to include in the name of the substance some of their distinguishing properties, as well as their components, and the proportions in which those components occur.

Q. How is this effected?

A. In the case of simple or elementary bodies, it is easily effected, by giving it a name which will recall some marked peculiarity of the substance. Thus phosphorus ("the light-bearer") and hydrogen ("the water-producer") each express the characteristic property of the element.

Q. Is any other plan adopted to show similarity between elementary bodies?

A. Yes. The termination *um* is now generally adopted for the metallic elements; and amongst the non-metallic bodies, the similarity of the terminations of chlorine, bromine, iodine, and fluorine, suggest analogy of properties. The rules governing the expression of chemical compounds, reactions, and decompositions, by symbols, having been fully treated of in the commencement of this Catechism, need not be treated of again in this place.

THE NON-METALLIC ELEMENTS.

Q. What general divisions are all elementary bodies divided into?

A. Into non-metallic and metallic elements. These will be treated of in order, commencing with the non-metallic bodies.

Q. How are non-metallic bodies subdivided?

A. Into four divisions.

Q. What are the constituents of the first division?

A. The first division includes the four elements which enter into the composition of the all-pervading and all-important substances, air and water. They are—

Oxygen,
Nitrogen,
Hydrogen,
Carbon.

Q. What constitute the second division?

A. The second group consists of what are sometimes called the halogens, and consist of—

Chlorine,
Bromine,
Iodine,
Fluorine.

Q. What are the elements comprising group third?

A. These are three combustibles, namely—

Sulphur,
Selenium,
Phosphorus.

Q. What are the fourth group?

A. The remaining non-metallic elements comprising the fourth group are—

Silicon,
Boron.

OXYGEN.

Q. What is oxygen?

A. Oxygen is a colourless, inodorous, and tasteless gas, very slightly soluble in water. It is a powerful supporter of combustion.

Q. What takes place upon introducing any combustible substance into oxygen?

A. If the body be undergoing combustion, such as a lighted taper or match, it burns with greatly increased brilliancy and rapidity; but if the body be not already ignited, no change takes place upon introducing it into oxygen.

Q. What takes place when ignited carbon is introduced into oxygen?

A. The carbon rapidly burns away with evolution of intense heat and light, and production of carbonic acid.

Q. How is oxygen prepared?

A. Oxygen may be prepared in several different ways, one of the most important being by the ignition of binoxide of manganese. The decomposition takes place according to the following equation:—

$$3MnO_2=Mn_3O_4+O.$$

The binoxide of manganese is introduced into an iron bottle, having an iron tube screwed into it. The bottle is heated to redness, when an evolution of oxygen takes place.

Q. Can oxygen be prepared in any other manner?

A. It can. One of the readiest means of preparing it in small quantities, is by heating chlorate of potassa in a glass flask. If the chlorate be mixed with one-fifth its weight of binoxide of manganese, the evolution of oxygen takes place at a much lower temperature. The reaction takes place according to the following equation:—

$$KO.ClO_5=KCl+O_6.$$

It will thus be seen that the latter method gives oxygen more abundantly, as well as at a lower temperature, than the method with binoxide of manganese alone, three equivalents of the latter being required to produce one of oxygen; whilst, by the latter equation, one equivalent of chloride of potassa will evolve no less than six of oxygen.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 13*th August*, 1860.

Is it not astonishing, knowing how many expert photographers are to be found in Paris, that the astronomical expedition which left this capital to study the eclipse of the 18th of last month, in Spain, did not think proper to engage the services of some experienced photographer? This expedition consisted of M. Leverrier, Director of the Observatory; MM. Villarceau and Chacornac, also attached to the same establishment; and M. Foucault, a distinguished amateur physicist. Now, these four gentlemen are, doubtless, very good astronomers; but I question whether any of them are capable of taking a proper photographic proof. It appears that this part of the operations was confided to M. Foucault. A camera was mounted equatorially; it had a double objective, with a wide aperture and short focus; it produced upon the ground glass a solar image of great intensity. The apparatus bore a small telescope finder, and the whole could be moved by screw-work; so that, by keeping the sun's disc constantly in the same position towards the micrometric wires of the telescope, the operators hoped to render the image immovable upon the plate of the camera.

Recently sensitised collodion plates were employed. As soon as the last ray of light had disappeared, a first plate was placed in the focus, and underwent an exposure of 10 seconds; it was then replaced by a second, with an exposure of 20 seconds; and, finally, by a third, which was allowed 60 seconds' exposure. On being taken from the camera, these plates were treated with sulphate of iron and cyanide of potassium, in order to obtain direct positives.

"In the precipitation of the manipulation," says M. Leverrier, "the apparatus must have been accidentally moved whilst the objective was uncovered; the consequence has been that, on the first plate, a number of images were obtained (!). As they must have been impressed at very short intervals, they will form valuable elements of discussion." I don't agree with the learned astronomer; I think such proofs are not worth discussing at all. On the three plates six images were obtained! Now, this terrible photographic blundering would have been prevented, and interesting results obtained instead, if a proper photographer had been attached to the expedition.

The Padre Secchi, of Rome, who was stationed at the Derierto de los Palmas, whither Arago had formerly resorted for astronomical observation, is an experienced photographer, and writes to the *Cosmos*, of last week, that he succeeded admirably in delineating, by photography, five phases of the total eclipse. The photographic images confirm the details he has given in a memoir upon the phenomenon. The light of the rose-coloured protuberances is so vivid—according to M. Secchi—that it acts almost instantaneously upon the photographic plates. The corona was photographed in 30 seconds; it was broad and clear, but its radiations left no trace upon the plates.

M. Leverrier has forwarded the results of his astronomical observations of this eclipse to the Minister of Public Instruction. His report contains a considerable mass of details, which it would be impossible to reproduce here.

The grand problem was to endeavour to discover the nature of those curious red protuberances that are observed in a total eclipse of the sun. Now, M. Leverrier, MM. Villarceau and Chacornac, and the Padre Secchi, are all of opinion, from their recent observations, that these protuberances belong to the sun. MM. Villarceau and Chacornac were stationed on Mont Moncayo; their task was to measure the positions of the protuberances, in order to discover whether they belonged to the sun or to the moon, and for this purpose their instruments were provided with special micrometers. M. Leverrier, reporting upon their observations, says:—"It is, therefore, an incontestable fact that the rose-coloured protuberances pertain to the sun. They are an accidental emanation of that gaseous, transparent, and rose-coloured strata that appears to cover the whole surface of the sun, and which is eight or ten seconds in height. The protuberances, doubtless, are formed by some of those perturbations which give rise to solar spots, and we may suppose that there exists an intimate connection between the two."

The *Moniteur Scientifique* speaks of a mineral water of Saxon, Canton de Valais (Switzerland), analysed by M. Ossian Henry. The spring is remarkable for its containing iodides and bromides of calcium and magnesium, besides bicarbonates of the earths, some sulphates, and an arsenical principle. The proportion of iodine amounts to 0·14 of a gramme per litre; that of the bromine to 0·04 of a gramme. The water of this spring obtains its mineral elements from a very curious dolomitic rock, which itself contains a notable quantity of iodides and bromides. The water has a smell of free iodine.

La Science Pour Tous tells us that Dr. Dubois has succeeded in colouring oak wood black or ebony. To this effect the wood is placed for two or three days in tepid water, in which a little alum has been dissolved. In the meantime, a handful of logwood is boiled in about a pint of water, and, when the liquid has evaporated to about half its volume, it is withdrawn from the fire, well stirred, and a little indigo is added to it. As soon as the latter is well dissolved, the wood is plunged into this hot bath, withdrawn, and dried. The same operation must be repeated twice. After this, some acetate of copper is boiled in some good vinegar, and the wood is rubbed with this solution; after it is dry, it is rubbed again—first with a brush, then with a piece of oiled leather.

MM. Meschelynck and Lionnet address to the Academy of Sciences a new method of obtaining pure carbonic acid, with a view of employing it to precipitate the lime used in extracting sugar from the beet-root. The first idea of using carbonic acid for this purpose appertains, perhaps, to M. Kuhlmann, who proposed it some twenty years ago; the author, however, abandoned it, on account, probably, of his numerous occupations. It was brought up again in 1848 by M. Rousseau, and again abandoned—in spite of the successful results obtained in 1849 and 1850—because the process for obtaining the carbonic acid was not applicable on a large scale.

Now, the above-named authors, starting from the fact that carbonate of lime is very easily decomposed in presence of a current of steam, have established an apparatus for thus obtaining carbonic acid. They heat the chalk only to dull redness, and then let on to it a current of steam. The carbonic acid gas is collected in gasometers, and preserved for the sugar process.

ALBUMEN DRY PROCESS.

To the Editor of the "Photographic News."

Sir,—I am obliged to Mr. Archer for rectifying the mistake I made as to the proportion of sugar-syrup added by him to the albumen. In his directions for preparing "six ounces of albumen," he says, "lastly, add two ounces of syrup," and I therefore fancied he meant 25 per cent. of the latter; but on reference to his letter, I find he uses two-thirds albumen to one-third of syrup, which are the same proportions as those of Mr. Coale.

The new features introduced by Mr. Archer in this process appear to be these:—1. To omit saturating the aceto-nitrate bath with iodide of silver; 2. To use an improved method of albumenising the plates, coagulating the albumen by heat; 3. To develop with gallic acid and acetate of lead. In place of the last, I suggested the use of protosulphate of iron, on the authority of Mr. Delamotte, as well as on the general principles applicable to dry plates. I also hinted that the course now so generally adopted with dry plates—namely, the conversion of the free nitrate of silver left on the surface (after dilution by dipping in a water-bath) into chloride or acetate of silver—might be advantageously resorted to in this process. In his "reply" to my letter, Mr. Archer takes no notice of this, but says the iron developer "*may* be useful, and deserves to be tried." I cannot help expressing my surprise that this is all we can get from a gentleman who has come forward to invite discussion on a process which he has proposed for adoption, in preference to plates prepared with collodion. Surely he might have tried the iron developer upon one plate, by way of experiment, during the last fortnight, if he were unable to decide the matter on principle.

I will only advert to one point more. Whipple's plates would keep good for a month during the hot weather of the United States, and, of course, considerably longer in England. Mr. Coale affirmed that his plates would keep two months after sensitising, and he then resided at Baltimore. Mr. Archer has every reason to believe that his plates will, if properly washed, keep a month, at least. Now, as I have been to Baltimore twice, and know what the weather is there, I should think that if these plates will keep well in that climate for two months, they would keep four months in this country. I advise Mr. Archer to put by half a dozen plates, in order to test their keeping qualities. If he will expose one every month and report the result in the "Photographic News," he will do good service. Plates prepared by the old albumen process would, I believe, seldom keep more than three or four days after sensitising. But even in that process, if the free nitrate in the film had been converted into chloride, phosphate, or acetate, a very long keeping might have been calculated on, and the sensitising-bath might have been left at home, instead of forming an indispensable travelling-companion to the photographer on a tour. The necessity of sensitising waxed or albumenised paper so shortly before exposure, and, consequently, of taking baths and dishes with one, constitutes a serious objection to these processes, and turns the balance in favour of glass, unless for very large pictures. With prepared plates, the tourist should be confident in their keeping qualities for three months, at least.—Yours, &c., An Amateur.

Proceedings of Societies.

French Photographic Society.

At the last meeting of this Society, held on the 20th ult., photographs were exhibited of the drawings executed by Jacopo Chimenti da Empoli, a Florentine painter, who died in 1640. It will be remembered that these drawings were lately seen at the Museum Wicar, at Lille, by Sir David Brewster, and were supposed by him to be stereoscopic. This opinion had caused much excitement in the photographic world, inasmuch as, if correct, it would have shown that the principle of the stereoscope was known upwards of two centuries ago. But the photographs of these drawings, taken by Mr. Bingham, when placed in the stereoscope, exhibit no appearance of relief whatever. Consequently, the discovery of this valuable instrument still remains to ennoble the annals of science of the nineteenth century.

M. Champion made the following remarks on negatives intended for enlarging:—

"To obtain negatives for enlarging, we are in the habit of using objectives of short focus, because they give us, in small dimensions, vigorous proofs more rapidly, and as the focus where the different planes seem to blend together, is more perfect in these objectives.

"This would be right, if there really existed a limit where the different planes blend in a single point, and if the objectives of short focus do not produce more deformity than objectives of long focus. Unfortunately, it is not so. The limit is not absolute: it exists only relatively—that is to say, each of us finds it where he perceives no difference of sharpness in the image. But if, by any means, we increase the power of our eyes, we recognise flaws in the details which appear perfect to the naked eye, and appear only beyond this limit, which recedes more and more, in proportion as we augment the amplitude of our visual functions.

"If we look at the sun, even with a lens of short focus, and slight magnifying power, we are obliged to shift the focus for each group of spots we observe on its surface, according as these spots are found by their position more or less distant from us; and we also know that even for the stars, the foci differ.

"I regret having taken my examples so distant; but they prove, I believe, in an evident manner, that at whatever distance it may be, the different planes do not actually blend in one and the same focus.

"This established, the conclusion is easy. Every objective distorts the image; that is to say, it exaggerates the proportions of the anterior planes. Those with the shortest focus deform the most. Consequently, as there is no limit where the different planes are found brought to one and the same focus, the less focus we have, the more deformity we must have.

"This is no inconvenience with small proofs; on the contrary, this deformity even flatters us. The opposition that it establishes promises us details which please at first sight, or when slightly magnified. But when we wish to enlarge these proofs to certain proportions, this defect comes out in a repulsive manner, and we have nothing perfect.

"I have deduced, that for negatives intended to be largely magnified, we must, notwithstanding some difficulties that may present themselves—difficulties that we may overcome, I hope—we must, I say, make use of objectives with long focus; of those, in a word, that deform the least. Objectives must have their focus much longer in proportion as we wish to obtain proofs nearer to the natural size of objects. It is evident, for example, that for a landscape or an architectural view, there will always be a very great difference between the dimensions of the proof, however large it may be, and that of the landscape or the edifice, for the difference of focus will be less striking. Thus we can make use of objectives of shorter focus, and obtain satisfactory results; but for portraits, where we approach the natural size, we must necessarily employ objectives with long focus."

M. Bertsch demanded permission to reply to these remarks.

"In remarking the defects of objectives intended to operate at a focal distance—perhaps more distant than their focal distance—M. Champion has exhibited, in all its truth, the weak side of these instruments, that the inflexible law of the conjugate foci do not permit us to render perfect. The double objective, however excellent it may be, and what services it may render, exists only by a sort of compromise between optics and photography. We are greatly indebted to it for very beautiful results; but we must not require of it impossibilities. If it gives different planes equally sharp, it is on the condition of altering the relations a little, and it gives the images only as we see them ourselves if we look at them from a distance nearer than distinct view. What we do not require of our eye—an instrument more admirable of itself than all the optical instruments combined—we should not be right in requiring of an apparatus made by the hand of man.

"The double objective distorts—that is indisputable; but if we do not desire to enlarge the images it gives, there is a distance, relative to the focus, where the defects will be imperceptible.

"As to single objectives, M. Champion does not, it appears to me, do them justice. Double objectives distort objects when they are refracted at a greater distance than their principal focus; but in limiting it, as I have done, in acting only with this latter—in guaranteeing it by a diaphragm suitably placed for spherical aberration—no deformity is admissible. Starting from the principal focal distance, all the pencils are parallel, whatever be the difference of the planes which reflect them. For this, it is sufficient to place the object at a distance from the lens equal to a hundred times its radius. Then if, in observing the partial differences of the sun, M. Champion was obliged to vary the position of the eye-piece, that was on account, not of the greater distance of the edges of the sun than of the centre, but of the position of the eye, which probably did not remain perpendicular to the plane of the coloured glass intended to protect the sight, and which, in consequence, could even modify the value of the refraction."

M. Regnault remarked that the double objective cannot be removed indefinitely from the object in the hope of diminishing the distortion, because, being calculated from a nearly constant distance, nearer or farther from it, it does not give so sharp an image.

M. Poitevin exhibited several specimens on paper and glass, and vitrified, of photographic printing in carbon, or other substance, by a process based on new chemical reactions, of which he gave the following explanations:—

"The specimens of photographic printing on glass, in vitrified colours or otherwise, and upon paper, are the first results I have obtained by applying a new chemical reaction for the fixing of carbonaceous or other bodies by light.

"This reaction, which is produced only under the influence of light, consists in covering a surface with a mixture which is neither sticky nor hygroscopic in the dry state, but which becomes deliquescent by the simple action of light passing through an ordinary negative.

"I therefore impress my prepared surfaces through a negative, and afterwards apply a colour of which I desire to form the picture; this colour only adheres to the parts which have been acted upon by light.

"I may add that this new process is not based upon the decomposition of the bichromates—a property which I applied in 1855, and which has since been practised by several skilful operators."

M. Pesme presented a series of proofs sent by Messrs. Colpaert and Garreaud, from Peru; they consist of views taken at and near Ariquipa, at an elevation of 13,000 feet above the level of the sea. Thinking that their observations may be useful to other photographers, they have accompanied the views with some details of the difficult circumstances under which they were taken.

M. Regnault remarked that these views possess a deep interest, both to the physicist and the artist, who may both find in them curious and important data. They exhibit very excellent results of what may be accomplished by intelligence and energy, while pursuing photography under difficulties.

Dr. Valtier exhibited a proof, singular in having three impressions of a decoration on the breast of the sitter, whereas there was but one object. This result was supposed to be due to a vibratory motion given to the camera, at the moment of first exposure; the brilliancy of the decoration causing an instantaneous impression to be made on the sensitive film at each vibration.

This being the last meeting of the season, the Society adjourned till the 19th of October.

Art in the Arctic Regions.—The American Photographical Society, at its last meeting, made arrangements to send a photographer with the expedition of Dr. Hayes, which sailed for the Arctic regions at the end of June. The project must meet with favour from all concerned, and if carried out liberally, will be productive of a great deal of good. If good photographic views are brought back, we shall be able to study Arctic geology, natural history, and even the climate, all by our cheerful firesides. A photographic view always shows more than any pencil sketch, and we are sure it tells "the truth, and nothing but the truth." The camera takes in *everything* before it; and it may be that the Arctic photographs will enable us here to discover important facts which would escape the attention of the traveller chilled with cold, however zealous he might be.

Photographic Notes and Queries.

"THE NEW DISCOVERY."

Sir,—An advertisement has appeared in several papers with the above heading, stating that portraits and views may be taken by day or night without apparatus, the necessary information to be communicated for 2s.

As some of your amateur photographic readers may suppose this discovery is a rapid advance in their art, calculated to supersede the tedious process of camera and collodion, I beg, with your permission, to give them the advantage of my 2s. worth of experience; and if I save any one of them that amount, the object for which I expended mine will be answered.

The process is this: you must first procure a marble slab and a burnisher; secondly, a portrait or view cut from the newly-printed pages of some illustrated work; then lay a clean sheet of paper on the subject selected and rub it with the burnisher on the slab, and you get a copy.

Your readers will perceive that the discovery is not quite new. The art of printing could not have been long in existence before the printer discovered that a newly-printed page would "set off" a portion of its impression on anything with which it might happen to be brought in contact; but it is simple, for although the advertiser says in his instructions the slab and the burnisher *must* be first procured, he is more strictly correct when he says in his advertisement, no apparatus are required, as it is obvious a table and your thumb nail will effect the same object.—I am, Sir, your obedient servant, P.

PHOTOGRAPHIC DISCOVERY.

Sir,—I am well aware that you are not liable to an infirmity and weakness to which some of your contemporaries are subject, viz., that of publishing *bonâ fide* complimentary letters to yourself; but I hope that, on the present occasion, you will deviate from your usual practice, and find a place for the following remarks. I wish to say how much photographers are indebted to you for the promptness with which you announce every new discovery in our art, and for the liberality you accord to every new discoverer, whatever be the land of his birth. Your recent announcement of the photographic ink and the automatic camera is truly exciting, and it is most earnestly hoped that the anticipations called forth will be duly realised. Other journals, Sir, are generally a month or two in arrear of your intelligence; while you dash along like a locomotive, they come lumbering along like the York wagon of olden times; and by the time they make their appearance, their wares have become stale, flat, and unprofitable, while the temper of the driver has become soured and bitter, and he will have it, your grapes are very sour. But, in this case, I think, and others think so too, "The race is to the swift, and the battle to the strong." Perkin Warbeck.

Kensington Gore, Aug. 13th, 1860.

IMMORAL PHOTOGRAPHS.

Dear Sir,—In the last number of the "Photographic News" appeared a notice headed, "Immoral Photographs," in which is stated there are two establishments at which these indecent pictures are taken: one at *Kentish Town*, and the other at *Clapham*.

I have never heard of any establishment but mine in Clapham; and as I do nothing in the immoral way, I will thank you to rectify the mistake, as it is likely to do me a very serious injury.—Yours, respectfully, Alfred Silvester.

Stereoscopic Studio, 8, *New Dorset Place, Clapham Road,*
August 13*th,* 1860.

[The circumstance that Mr. Silvester has not heard of another establishment in his neighbourhood does not prove that none exists. We need hardly say that the parties engaged in the infamous traffic which our correspondent "Δ" has exposed do not court public observation. We are sure that no allusion was intended to be made to Mr. Silvester's establishment, which we believe to be a highly respectable one.]

DARK-ROOM WINDOWS.

Dear Sir,—Perhaps some of your numerous readers would point out some composition by which the pores of yellow calico could be filled, so as to exclude the passage of white light through the holes, but still preserving its yellow colour and transparency.

Two or three folds of the calico would, I know, exclude the white light, but these would be too bulky and heavy for my purpose. What I want is something which, whilst preserving, or even increasing, the yellow transparency, would absolutely exclude the white rays.—Yours, sir, very truly, M. M. D.

Carlow, 31st July, 1860.

TO CORRESPONDENTS.

*** We beg to announce to our readers and correspondents, that after the publication of the present number, the "Photographic News" will be published by Mr. Piper, at the office of "The Photographic News," 32, Paternoster Row, where all communications for the Editor, and Advertisements, must in future be forwarded.

M. M. D.—1. There is nothing better than one or two coats of good drying linseed oil, but the drying quality of the oil ought to be tested; if it dries tacky, expose it to the sun's rays, or to a good fire. 2. Any lens will do that gives a picture of the required size, free from distortion. 3. Refer to Mr. Warren De la Rue's paper on "Instantaneous Photography." 4. This question is answered in the last and present numbers, in articles on "Iodide of Silver," and "Dry Collodion."

Nitros.—We have no doubt of the accuracy of the Abbé Moigno's statement respecting the qualities of the photographic ink: in fact, his evidence is confirmed by M. Ernest Lacan, the editor of *La Lumière*. See article in the present number of the "News."

Doric.—Architectural photography, by all means: it offers a very interesting and profitable field for the exercise of your taste and talents. But you should make yourself acquainted with the elements of architecture. Useful manuals may be obtained for two or three shillings.

Viator.—You will have no reason to regret using dry-collodioned plates for out-of-door photography. As to time of exposure, make a trial of a plate before you start on your journey.

Dubious.—The advertisement has a very suspicious aspect. As it must be answered in person, take care to go accompanied by a brother, or other protector. You will then find yourself promptly "bowed out."

H. A. J.—A lead, or other neutral colour will answer best, or even brown paper will do very well. By tilting the screen, you will be able to vary the tone or intensity.

J. Burns.—1. Next week. 2. Saturated solution. 3. Several formula have lately been given; there is one in vol. iv., page 14, of the "Photographic News."

O. S.—It will be necessary to inclose the sitter with some kind of screen, in order to obtain good chiar-oscuro. The subject has already been fully explained in the pages of this journal.

Youngster.—Provide yourself with a good manual of photography. You are not in a position to ask questions, at present—simply because you do not know what to ask.

T. Thorne.—We cannot recommend you to undertake so long a journey, with the object you have in view. The ground has already been gone over, and the photographic results are in the market.

Aster.—Some good photographic studies of animals would be very acceptable; but they should be *very* good, and perhaps will require to be taken by an instantaneous process.

Ongar.—You had better take a lesson from a practical photographer. The difficulties you encounter are due to your want of acquaintance with chemical manipulation.

A. B.—If you boil your nitrate of silver in an iron saucepan, as you propose, it will not be nitrate of silver when the operation is concluded.

Otis.—We know of no way of completely restoring old collodion; it may be partially restored by the addition of some fragments of cadmium foil.

Camp.—You have given insufficient data to enable us to come to any satisfactory conclusion.

H. H. T.—Your communication is of no practical value. You appear too ignorant of many important things that have been recently discovered.

Kaolin.—Kaolin is a silicate of alumina. China clay, obtained in Dorsetshire, is the same thing.

Exeter.—We have not seen the views you describe, but should like to have the opportunity of doing so.

Sol.—Photographs of the late eclipse were taken in the United States by Mr. Rutherford and others.

W. R.—He is a very good maker, and his prices are reasonable, considering the excellence of his workmanship.

Doubtful.—The expense of a glass-house is not necessary. By a proper distribution of reflecting-screens you can get all the light you will require.

A Subscriber.—A small pane of orange-yellow glass will admit sufficient light. Ventilate by a horizontal aperture near the ceiling.

Octave.—Your specimens are very creditable for a young beginner; but they were kept too long in the toning-bath.

A. C. D.—You cannot do better than be guided by Messrs. Davanne and Girard's articles on fixing positives.

W. Young.—Your collodion is evidently of very bad quality. There is plenty of good quality in the market.

Chromatic.—The present series is concluded in the current number of the "Photographic News." The subject may possibly be resumed.

H. P.—You have quite spoiled your bath. The silver may be recovered by any of the methods detailed in previous numbers of the "News."

George.—You can easily obtain a suitable camera for taking visiting-card portraits.

Lens.—We know nothing more than is stated in the advertisement. You must judge for yourself.

Presto.—Instantaneous photography is not a secret process. It has recently been described in these pages.

Orson.—We cannot undertake to reply personally to your long letter. State your questions clearly and concisely.

W. Thompson.—You will require to go through a course of physical science and chemistry. Considerable attention should be given to botany.

F. F.—It is better to introduce animate objects into your landscapes, whenever you can do so; the scene will look cold and lifeless without them.

Louisa K.—Most of the American stereographs we have seen are views in Canada; doubtless there are others.

Glasguensis.—It was a misprint. It should be *chloride of sodium.*

Young Beginner.—Consult our advertising columns.

All communications for the Editor should be addressed to the Office, 32, Paternoster Row, London.

THE PHOTOGRAPHIC NEWS.

Vol. IV., No. 181.—*August* 24, 1860.

TO OUR READERS.

With the present number the Photographic News passes into the hands of a new proprietary, and a fresh literary staff undertake its management.

Nearly two years have elapsed since the issue of the first number, in which the projectors stated their conviction that "such an organ was imperatively necessary to meet a palpable demand." That such a conviction was well grounded, and that the Photographic News has, to a large extent, supplied the hiatus, the welcome with which it was greeted, and the success that has attended its issue, furnish satisfactory evidence. It is not, however, with its past history *we* have to deal.

Our own introductory remarks will be few and brief. We shall prefer to be judged by deeds rather than words—by fulfilment rather than promise. We would not, however, willingly enter on our new task,- and commence our new relations with so many friends, without a few words of introduction explanatory of our aim and purpose.

In the future management of this journal we intend to retain all the features which have hitherto given it interest and value, whilst we hope to add others which shall increase the pleasure and augment the profit derived from a perusal of its pages. To this end the services of those of its literary staff whose contributions have proved most valuable will be retained, whilst arrangements have been made, and others are pending, for securing the aid of gentlemen whose contributions cannot fail to promote the interest of our pages, and the advancement of the art to which they are devoted.

The features intended to distinguish the Photographic News at its commencement were stated to be:—

"I. Under the head of 'Notes and Queries,' replies to correspondents who may seek information on photographic and other scientific subjects of a kindred nature.

"II. Information derived from foreign as well as domestic sources, of all discoveries and improvements in photography, optics, photographic chemistry, and other cognate sciences.

"III. Elementary lessons in photography, together with a dictionary of photographic terms.

"IV. Reviews of books on photography and its kindred sciences, and critical notes of exhibitions of photographs and other works of art.

"V. Reports of the transactions of English and foreign photographic and other learned societies.

"The Photographic News, as the recognised organ of photography, will be the guide and instructor of the beginner, and the medium of communication and interchange of ideas between more advanced students, and the record of all improvements and discoveries which may take place in the art, or in the allied sciences of optics and chemistry."

These features we intend to preserve, and, where we can, augment their value. The dictionary of terms used in photography is drawing to a close, and will, at its termination, be replaced by a series of practical papers in preparation, which will be found of much value at once to the amateur and professional photographer. The reviews will be extended not merely to books, but to everything connected with the practice of photography; avoiding, however, with the utmost scrupulousness, a system of "trade puffing," which we regard as at once misleading and insulting to photographers, injurious and degrading to the firms so noticed, and in the last degree damaging to the purity and dignity of scientific journalism.

The earliest and most reliable information as to all photographic proceedings and discoveries we hope at all times to lay before our readers, inviting from them the fullest and most unfettered discussion in our pages of all subjects requiring consideration and elucidation; and whilst we hope from time to time to assist by suggestion and comment in the establishment of scientific truth, we trust it will be in the position of an impartial moderator rather than that of a dogmatic oracle. We thus hope that the Photographic News will become the pioneer as well as the recorder of photographic progress.

To the cultivation of the artistic element in photography we hope to give special attention. Photography, although the offspring of science should possess an undoubted claim to recognition amongst the sisterhood of the arts. Causes too numerous and varied to be discussed here have hitherto prevented such recognition from being either common or cordial. We believe that a more universal and elevated art culture amongst photographers is desirable, and to keep its importance before our readers, and aid in its accomplishment, will be our constant care.

We do not present ourselves as the especial organ of any society; but we hope by serving their interests, and recording their progress, to sustain the position, not simply of the organ of all societies, but of photographers at large.

We commence our work with a "clean bill of health," we have no foregone conclusions to maintain. no personal prejudices or animosities to serve. For the editors of contemporary journals we entertain personal esteem and a due appreciation of the value of their labours. We believe there is a field and work wide enough for all, and so far as their aims and our own are identical, we believe that in such an enterprize the more efficient hands there are to do the work. the better it will be done.

We enter on our task, therefore, in an earnest and hopeful spirit. We feel that we address many thousands of readers who will appreciate our efforts and assist us in our work. We enter into no detail of specific pledges, because many of our plans are still in process of formation. We simply ask, therefore, to be judged by results.

GOVERNMENT COMPETITION WITH PHOTOGRAPHERS.

A question of some considerable importance to professional photographers has recently come under the attention of a Committee of the House of Commons, and has, we regret to say, subsequently issued in a decision, by a vote of the House, upon the justice of which we think, to say the least, considerable doubt must rest.

Many of our readers will be aware of the existence of a Photographic Department in connection with the South Kensington Museum, which was established "primarily," as a report before us states, "to furnish models for the use of the eighty Art-schools in connection with the Department of Science and Art." After providing for these it is added, "it has been thought right to give the public at large the benefit of the photographs at cost price, upon a self-supporting system, for the general benefit of art education." This, at the first blush, would appear a most laudable purpose, and one calculated to promote the advancement of the art, the importance of which in an educational point of view it so thoroughly recognised.

From the evidence, however, given before a Committee recently appointed to report upon the general management of the Department of Science and Art in connection with the museum, we find that this laudable purpose has issued in an attempt to monopolise the production of photographs of a class of subjects which are legitimately the province of professional photographers, and also in a trade competition with private enterprize; a competition the more oppressive, seeing that it is carried on by the aid of the taxes to which the private trader is compelled to contribute. Not only have the Department issued photographs of subjects which had already been published by professional photographers, but they have issued them at a cost absolutely considerably less than they can be produced by persons unaided by a Government grant of "£1,500 for photographic apparatus, chymicals, labour, &c." This competitive tendency attains its climax in an offer, made in the official catalogue of the Department, to the effect that "the Government photographer is ready to go out to other museums and galleries on similar terms to private photographers!"

The most conclusive evidence of the unjust and oppressive tendency of this competition was given by the representative of the firm of **Caldesi, Blandford** and Co., and others; notwithstanding which, however, the Committee report that, after fully investigating the subject, they "consider that there is no other course so free from objections or so good for the public at large, as the present system of the Department."

This decision, we regret to say, has received the practical approval of the House of Commons. On the motion for a grant of £94,951 for the Department of Science and Art at South Kensington, Mr. **Coningham** called attention to the "profligate expenditure" of public money in this Department generally, and more particularly to the "indefensible system pursued in regard to photography," characterising the report generally as a most "unsatisfactory document." The house was divided on the question "That the sum of £1,500 for photographic chymicals, labour, &c., be omitted from the vote." The vote was, however, carried in its integrity, by a majority of sixty-one, the members being eighty to nineteen. For the present, therefore, the question is settled, and things remain as they were.

We trust, however, the matter will not be allowed to drop. The present is but a repetition of a similar injustice perpetrated years ago against the book trade, when school books were issued by the Government at a price beyond the competition of private enterprize. Two eminent publishers then memorialised the Government, suggesting that if the Government were to take possession of some district "to grow corn upon it, to construct bakehouses, and to supply the people with bread at less than its cost price, making up the deficit by taxes levied on those very agriculturists whom the Government had thus done its best to destroy," the case would not be less iniquitous or more intolerable than that already pursued. The efforts then made by the publishers were successful and the competition was withdrawn. Professional photographers, and all interested in the advancement of photography, are concerned in a question which threatens to destroy some important branches of art by rendering their practice unremunerative; as we have it on authority so high as that of Mr. **Roger Fenton** that "he had given up all the higher branches of photography, as he found himself unable to compete with a Government department."

One word more, interesting to photographers, and somewhat illustratve of the spirit in which the evidence adverse to their interests was got up and delivered. Mr. **Panizzi**, an Italian gentlemen, who holds the highest office in the British Museum, stated that the only fire ever known at that institution was caused by the negligence of a photographer. Mr. **Fairbairn** stated that at the Manchester Art Treasures Exhibition "the photographic professors were *pests*, and that it was found absolutely necessary to limit the privilege to one person." "Photographic professors," we apprehend, are obliged to this gentleman for his opinion of them.

DISCOVERY IN THE COLLODIO-ALBUMEN PROCESS.

We call the attention of our readers to a paper read at the last meeting of the Manchester Photographic Society, in which the discovery of an important modification of the collodio-albumen process is announced by Messrs. Petschler and Mann. The plates are prepared in the usual way up to the point of coating with albumen, in the preparation of which, however, the use of a chloride instead of an iodide is recommended. In this stage the plates are as usual insensitive to light, one of them subsequently experimented on, having been, as stated by Mr. Sidebotham, the Chairman—an excellent authority on the collodio-albumen process—exposed for two or three hours in full sunshine. In place, however of sensitizing in the usual bath of aceto-nitrate of silver, they are simply washed in water, by which process they are rendered perfectly sensitive, produce excellent negatives, and present, in other respects, fewer difficulties than the old process.

The theory of the process propounded by the discoverers themselves is, that sensitiveness is restored by the removal of the excess of chloride in the film, the final wash removing everything but the insoluble salts of silver. On reference to corrrespondence in another part of our columns it will be seen that two gentlemen, without any concert or knowledge of each other, are struck with the identity between the modification now discovered and the Fothergill process, the manipulations, with the exception that in Messrs. Petschler and Mann's method the plates are dried before the final washing, being exactly the same. The theory of one of our correspondents appears to be that albumen in excess is the cause of insensitiveness in the plates, and that the final washing by removing the excess of albumen restores the sensiveness of the film. There are two points for consideration here, however, before these surmises can be accepted: in the first place does an excess of albumen render the collodion film wholly insensitive to bright light? and in the next place was the albumen in the plates experimented on by the gentlemen in Manchester, sufficiently free from absolute coagulation to be soluble in water, and thus capable of being partly removed in the final washing which rendered them sensive? The Chairman stated in answer to a question that the albumen was coagulated, but not perfectly so. It will be an interesting experiment to prepare a plate by the new process, coagulating the albumen on one half fully by heat, and leaving the other half free from such coagulation; expose freely to light, and then after the final sensitizing wash, expose, and develop. The result of such an experiment will be instructive, if not decisive.

A contemporary, in some remarks on this subject, after referring to various modes of restoring the sensitiveness of plates which have been exposed to light, such as the vapour of acetic acid, dipping in an aqueous solution of iodine, exposure to the atmosphere in the dark; suggests that in all these cases *moisture* may really be the agent which restores the sensitiveness, and neither acetic acid in the one case nor iodine in the other have anything to do with the matter. In considering these facts, however, there is another in connection with iodine to be remembered. It is well known that in the Daguerreotype process an exposed plate has its sensitiveness restored by exposure to the vapour of iodine for a second or two, and that the slightest presence of moisture would ruin the development of the plate.

The subject is a highly important one, and well worthy of further investigation. Whatever conclusion may be arrived at as to the theory, there can be little doubt of the value of the modification as a fact, if on further examination and experiment it fulfil its present promise.

SCIENTIFIC GOSSIP.

Those photographers who are in the habit of using the so-called melainotype plates, which is the name given to those plates of iron cut to the usual photographic sizes, and coated with an impervious black enamel, will have frequently been annoyed by the silver bath showing signs of decomposition after the first few plates have been prepared. It is quite true that the manufacturers of these tablets state that they will not decompose the silver bath, neither would they if manufactured with that care which ought to be bestowed upon such an article: but in practice it is constantly found that owing to carelessness in the making, or subsequent handling, the enamel comes off at the corners or edges, and exposes the metallic iron. Of course, when this is the case, the bath soon becomes unfit for use, and we therefore think that our fellow labourers will welcome the following hints on this subject as much as we ourselves did when our attention was first directed to them. Prepare a varnish composed of 1 part of Canada balsam, 4 parts of bitumen of Judea, and 4 parts of chloroform. This will form a black varnish which will flow readily. Next, cut a groove in a piece of wood about ⅛ of an inch wide, and the same in depth, and as long as the longest side of the melainotype plates. Fill the groove with the above-named black varnish, and then taking the plate between the thumb and forefinger, with the ball of the thumb against the middle of the front of the plate and the tip of the forefinger against the centre of the back of the plate, immerse the lowest edge into the groove of black varnish about the 16th of an inch deep. Lift it up and turn the plate a quarter round until the next edge is in position to be dipped in the varnish. Repeat this with all the four edges, and hang the plate up to dry by means of a wooden clip, taking care that the clip does not touch the varnished edge. A few minutes will suffice to coat a dozen or more plates, and when dry they can be stored away without any fear of there being bare iron on any of them to destroy the silver bath. The black varnish recommended for this purpose is also a very excellent one for backing up collodion positives, as the Canada balsam prevents the varnish from cracking. The best plan to clean the iron plates is to use a little old collodion, well rubbed over the surface with a rag, and then cleaned off with a soft piece of chamois leather.

An ingenious idea has lately been experimented upon by our American cousins, relating to a subject which must interest all photographers, viz.: the manufacture of paper. It is well known that the basis of wood is a pure white fibrous substance name lignin, which, when the sap and tarry bodies are perfectly removed from it, closely resembles cotton, and can be used for most of the purposes to which cotton is now applied, besides being capable of being made into an excellent paper. Some gentlemen have been experimenting for some time with the view of extracting this foreign substance in a manner that should be commercially available, for although not great in quantity, it penetrates every fibre of the wood. They put the wood into a big cannon, and after plugging up the muzzle, let it steam until the pressure is enormous, and every fibre of the wood is completely permeated with the condensed vapour. The gun is then fired by increasing still more the steam pressure, when the wood is shot out in a cloud of minute fibres, which are now purified with little difficulty, the highly condensed steam, which was in every pore, having, when the pressure was removed, effected the disruption of the mass into its ultimate fibres. Some facetious photographer has suggested that from the mode of its production this purified lignin ought to make very excellent *gun*-cotton. The experiment would be well worth trying.

In a recent number of the Photographic News we gave an account of some curious photographic experiments which had been lately tried with nitroprusside of sodium, promising at the same time to give our readers an account of the best method of preparing this salt. In answer to several communications on this subject we give the following process as one which has succeeded perfectly in our hands when preparing this compound :—common nitric acid is to be diluted with an equal bulk of water, and when cold, powdered ferro-cyanide of potassium is to be added in the proportion 270 parts of the anhydrous acid to 422 parts of the ferro-cyanide. The mixture gradually assumes a brown colour, giving off cyanogen and hydrocyanic acid with brisk effervescence, and the salt is dissolved forming a mixture of ferrid-cyanide of potassium and nitro-prusside of potassium with nitrate of potassa ; heat must be applied gradually to the solution by means of a water-bath, until gas ceases to be evolved, and the liquid instead of giving a blue precipitate with a proto-salt of iron, produces a dark green or slate-coloured precipitate. It must then be allowed to cool, by which means a large quantity of nitrate of potash, mixed with a small quantity of oxamide will be separated. The strongly coloured mother liquor must next be neutralised with carbonate of soda, by which a greenish brown precipitate is caused, and the liquid after filtration must be evaporated and allowed to crystallize. The salt separates from the solution in fine prisms of a ruby red colour, which require about 2½ parts of cold water for solution. For the experiments alluded to above a solution can be employed containing 1 part of the salt in 5 parts of water.

The subject of bituminized paper tubing is attracting great attention both in England and on the Continent. It is now being used in Paris for the conveyance of water underground, and with marked advantage as regards economy and durability. In England some interesting experiments have been tried respecting its impermeability to water, its power of resisting enormous pressure, its durability, and cheapness, on all of which points it is proved to be far superior to anything which has hitherto been used for similar purposes. We think that so valuable a material might very well be brought within the domain of photographers. It could not fail to be admirably adapted to the manufacture of cameras, plate-boxes, dishes and trays, and perhaps even dipping-baths, if it should be proved that the substance has no action on the silver bath. The subject is well worth the attention of some of our enterprising photographic manufacturers, and we should be glad to find that it has been successfully adopted.

M. F. J. J. De la Ferte has recently patented a process for "reproducing photographic and other pictures, engravings, prints, devices, and designs, on the surface of glass, ceramic, and other substances requiring to be fired to fix the same thereon." The patentee claims the reproducing photographic and other pictures, &c., by coating the surfaces with a sticky composition acted on by light, then printing on the surface in the manner of photographic printing, thus destroying or changing the sticky composition where the light acts upon it, and subsequently causing a suitable colouring matter to adhere to such portions of the surface as remain sticky. The surface is then submitted to the heat of a furnace when the colouring matter will be fixed in the glaze. Our readers will have no difficulty in perceiving that this is our old friend carbon-printing under a slightly different form. How such old and well-known processes can become the subject of a patent we know not. It could no more be substantiated in a court of law than could bromide patents about which our neighbours over the Atlantic are getting up such an excitement about. Our patentee claims the use as above stated of a composition containing bichromate of ammonia, or *other salt of chromic acid*, and honey or other similar sticky organic compound, *albumen* being also added. This is about as cool an appropriation of Mr. Talbot's last patent as we have ever seen.

PHOTOGRAPHY AND PHOTOGRAPHERS IN AMERICA.

We remember the time when Photography in America was regarded by all lovers of the art as occupying a very advanced position. It is certain that in the production of pictures by the Daguerreotype process our photographic brethren of the States were altogether unsurpassed—we had almost written, unequalled. We have ourselves seen in various cities of the United States hundreds of Daguerreotypes of all sizes of such exquisite beauty as to leave nothing to desire, and possessing photographic merits quite unequalled by anything we have seen elsewhere. Without stating that their steps have been at all retrograde, we cannot but be struck with the fact that their progress within the last eight or ten years has not been commensurate with that of cisatlantic photographers. Moderately good collodion positives and paper pictures of average merit we have from time to time seen during the last few years, but nothing at all, in our opinion, surpassing in excellence the productions of photographers in this country. A perusal of their scientific journals, whilst sometimes furnishing us with practical matters of value, always afford us something amusing and often amazing. A few gleanings from their pages will doubtless interest, and may possibly sometimes instruct our readers. Amongst the first of the items that startle us is—

A New Claimant for the Discovery of the Collodion Process.—It is necessary at the outset to explain that a considerable excitement exists at present amongst professional photographers in the United States, arising out of the extraordinary attempt to enforce a patent for the use of bromides in collodion, of which more anon. In order to invalidate this patent various statements have been published to prove the use of bromine in collodion anterior to the date of the said patent, which is July, 1854. With this view, and apparently in ignorance of the fact that the first published announcement of the use of collodion as a photographic agent was not until the year 1851, a correspondent of *Humphrey's Journal*, signing P. R. Krone, makes the following statement, and adds that he is willing to substantiate it by giving his "solemn oath whenever called upon."

"I am a German, born in Prussia, and my brother is now, and has been since 1844, one of the best artists in Europe, particularly in Saxony, in the capital of which kingdom he is practising his profession. He has been twice awarded gold medals at different public exhibitions. In 1849 I was with him, and at this period he used collodion composed of iodide and bromide of ammonium for negatives and positives on glass. In 1850 he used the bromide of cadmium, and I used myself in 1850, the following collodion for negatives :—In 1lb of plain collodion, I dissolved 1 drachm and 20 grains of iodide of cadmium ; I next prepared a saturated solution of bromide of cadmium in alcohol (4½ oz., 95 per cent. alcohol, ½ oz. bromide of cadmium) ; this solution, after twenty-four hours settling, is carefully decanted, and to 1lb of collodion already iodized with the iodide of cadmium, I add 1 drachm of the bromide solution. This solution is as clear as water when pure. I have, as abovementioned, used this preparation as early as 1850, and could have done so sooner."

Whether Mr. Krone's memory for dates is inexact ; his veracity at fault ; or the use of collodion for photographic purposes was a stale fact at the time Mr. Archer announced its discovery, we leave our readers to determine. We imagine there will not be much occasion to "divide the house" on the question of Mr. Krone's veracity.

Bromides in Collodion.—To return to this subject for a few moments, it may be interesting just to glance at the records of its use. The value of an agent in the sensitizing of collodion, which has played such an important part in other photographic processes, seems so obvious that it is somewhat surprising that records of its use are not coeval with the discovery of the collodion process. Yet so far as we have any reliable evidence before us there is no record of its use prior to 1853. In the Journal of the Society for the month of June of that year we find a paper from Mr. Crookes, detailing some experiments with bromidized collodion, and in the number following of the same Journal an account of the method of its preparation, and further remarks on its valuable properties. Up to a comparatively recent period, however, many scientific photographers have been slow to acknowledge what we believe to be its real value. Our own conviction, based upon numerous experiments, to which we may refer on some other occasion, is that it is almost impossible to overstate its importance in giving rapidity of action to the collodion, and great detail and softness, with freedom from spots and imperfections, in the pictures produced.

In the July of 1854 it appears Messrs. Cutting and Turner obtained a patent limiting the use of bromides in collodion in the United States to them or their licensees. How far the restrictions have been maintained since that period we are not aware; but we find that, during the last and and present year, a Mr. Tomlinson, who has purchased the patent right for the State of New York, has been enforcing its provisions. The terms upon which he grants licenses, or "room-rights," for each gallery, will strike English photographers as startlingly high and oppressive, being from fifty to two hundred dollars, or from ten to forty guineas a year, with heavy damages for all past encroachments; and in addition to this, each licensee must bind himself to take no collodon pictures for less than five dollars, or about a guinea each. In many cases where suits have been commenced, these terms have been acceded to, and the cases thus compromised; but a case now pending against a Mr. Fredericks has been vigorously defended, the suit having cost the defendant some time ago upwards of two thousand dollars.

Photographers in the States generally have been in a considerable state of excitement as to the issue, which, if decided in favour of the patentee, would close, it is stated, four-fifths of the galleries in the Union. Efforts have been made on all hands to show, what it is very easy to prove, namely, that bromides were commonly used long anterior to the date of the patent. We are afraid, however, that some of our transatlantic cousins are anxious to prove too much. In addition to the astounding statement we have given above as to the use of collodion in 1849, we find the editor of one of their journals stating that Mr. Archer announced the use of bromides in collodion in his original pamphlet, published in 1851. We have not the means at hand at this moment of verifying this statement, but if we remember rightly no such announcement is made. It is further added that Mr. Pike, late U.S. Consul to Portugal, an amateur photographer, and Mr. A. Ceileur, formerly practising photography in London, but now in New York, used bromides in collodion two years before the date of the patent in question, which would be as early as 1852. We cannot of course question the use by these gentlemen of bromides at this date; but if the statement we have made as to the first publication by Mr. Crookes in 1853 be correct, the private and unannounced use of this agent would be little to the purpose.

Patents for photographic processes generally we are disposed to regard as damaging to the art on the one hand, and difficult to maintain on the other. As regards the art, they clog its progress by limiting the field for profitable experiment; and as regards their maintenance in an art necessarily so progressive and changing, and depending upon such subtle modifications and varying combinations of the agents employed, it would be next to impossible to maintain the integrity of patents obtained.

The majority of the patents for processes obtained in this country have, we believe, resulted in loss to the patentees; and in no case that we remember have they been of such a frivolous and vexatious character, nor enforced at such an exorbitant and oppressive rate, as the bromide patent now existing in America.

FROM A PHOTOGRAPHER'S COMMON-PLACE BOOK.

INTRODUCTORY REMARKS.

The above-named MS. volume is not a very pretentious or important work; but some of its contents may, perchance, prove of an amusing and instructive character. Within its pages are notes of my rambles through the Provinces, jottings of photographic experience, chronicles of passing thoughts, sketches of amusing incidents, outlines of character, &c. &c. &c. I intend to re-peruse these; select such portions as I think most valuable or pleasant; re-write them, if necessary; and then, in parliamentary parlance contrive that such "do lie upon the table" of the Editor, with the hope that he will, in his wisdom, see fit to command that—"This paper be printed:" which done, to you gentle reader (all readers are gentle, you know), I leave the rest, hoping you may opine that when I did write I did right, and then nothing will be wrong.

To refer to my intentions yet again—there is a frequently-expressed want which I have become fully cognizant of through reading the various photographic periodicals, and from occupying the position of Secretary to one of the London societies—a want of information regarding the more picturesque localities suitable for photographic operations. Acting upon a suggestion of the Editor's, I intend, without pretending to possess any special ability for the task, to try and meet this want by publishing, in these pages, from time to time, extracts selected from my aforesaid "Common-place Book," descriptive of sundry and various trips made for, or tending to the purposes of photographing; pointing out, not only the localities, but the precise spots where a camera-stand has been or may be planted; and painting, as well as words will permit, the chief beauties, artistic capabilities, photographic adaptability, and other peculiar characteristics of the selected views; adding such other particulars regarding trains, routes, conveyances, inns, &c. as may make my communications of the more practical value. But do not imagine that I intend to give you anything resembling the old-fashioned guide-books, by merely stating that blank is in the county of stars, is situated three miles from so and so, or ten from somewhere else, and is reached by this or that means; for I shall just go my own self-chosen road, my own self-willed way (with a clear remembrance of a certain fable of an old man with a donkey); now and then sitting down by the road-side for a little chatty talk, or stepping boldly out of the more direct way to notice some chance-met object or incident of an amusing, novel, or interesting character. Therefore, if by-and-bye you should think me somewhat discursive, remember you were fairly warned, and, good-naturedly, forgive me. (It is a capital plan to bespeak a pardon before you offend.) There are certain folk who would overlook all the beauties within their sight to stare through a bad telescope at some ill-defined objects far away on the dim horizon, and these good people will undoubtedly slight these and similar unpretending chronicles of rambles in our own dear little island, and much prefer descriptions of photographic adventures in foreign lands—China, Japan, the Holy Land, Timbuctoo, or where not; but even such far-gazing readers will not deny my plan the palm of utility: and this is, after all, the chief merit I desire to lay claim to in writing my series of slight and unpretending papers.

Again, to make a clean breast of all my intentions before commencing their fulfilment, I intend to omit no opportunity of urging the practical reader to give some really earnest study to the principles of art in connexion with photography; not only in reference to the more mechanical and simple rules of art (already defined in these pages by Lake Price, and Charles Martel) but with a view also to demonstrating the importance and practicability of securing the higher order of poetical effects, of depicting, as it were, not merely the form, but the very soul of nature, in that spiritual beauty, which, although invisible to the coarse-minded and uneducated, yet speaks audibly to each and to all in language which, when translated from feeling into words, radiates in glory from the immortal pages of our Miltons and our Shakespeares! I will not pretend to claim for the photographer that power which the artist possesses of collecting varied beauties, scattered so "few and far between," and putting them together to form one harmonious whole; because the son of the camera can but put selection in the place of composition: but I *will* pretend to point out how frequently the finest piece of assumed composition is neither more nor less than pure selection, dictated by the refined taste and cultivated eye of the transcriber. Have we not all seen in one glance of nature such beauties as the painter's art could never excel, even if it could imitate? when—

> "sublimed
> To rapture, and enthusiastic heat
> We feel the present Deity, and taste
> The joy of God to see a happy world!"—

a faithful representation of which view, without either adding or removing a single feature, would embody all the feelings of our hearts; and convey to others, in their full force, those majestic thoughts and noble emotions, the originating of which constitutes the best and loftiest aim of the most aspiring of all human arts. I will not, *cannot*, deny how vastly important colour is to all the best and most poetical of natural and pictorial effects; but who that has seen the fine engravings from the works of our best painters can deny the great eloquence and power of tone in suggesting colour and its effects to the mind. But we must relax our hold of your button, dear reader, and go about our business. Good intentions unfulfilled are but paving-stones—as we have all been told—for a certain place below; so let me change at once the character of my own by hastening their fulfilment.

I will commence by giving you a sketch of some recent

RAMBLES ABOUT RAMSGATE.

The late weather, so fertile in producing colds, catarrhs, and devils blue, prompted me to seek health and pleasure in a change of scene and air; in which, by-the-bye, I have much greater faith than in all the drugs of the apothecary. Casting my eyes about among the list of our "health resorts," I determined to join a rather large party of my friends who had gone to Ramsgate; business would not permit my visit to be much more than a "flying" one of a week or two, nevertheless, my camera must accompany me. So bidding adieu to the photographic studio in which I had laboured day by day, and the pleasant evenings with easy chair and study-table of my home in the south, off I started one wet morning for the Fenchurch-street Station, to meet the train which was to meet the boat at Thames Haven. Behold me, therefore, going through "the wet process" of walking in the rain with my carpet-bag in one hand, a Leake's portable tent in the other, and borne behind me the remainder of my apparatus. To escape the pale, monotonous, misty, grey sky above the London housetops, alone seemed worth the journey, it was *so* long since it had been blue. Winter—

> "Sullen and sad, with all his rising train—
> Vapours, and clouds, and storms,"

seemed lingering to meet his sometime herald—Autumn, and the announcement of *Punch* that "there would be no summer this year," in consequence of the Zodiac being "taken up for repairs," seemed indeed but sober truth. A faintly promising spot of blue among the gloomy, vapory clouds seemed "to marshall me the way that I was going," and I said hopefully, *who knows, perhaps the sun shines there.*

How people will push to get their railway tickets: there was plenty of time, ditto room, and seemingly very few passengers going by the train, and yet no sooner did the clerk's amiable nose, mouth, and shirt front appear at the little square opening through which money was exchanged for bits of pasteboard, than, from left, and right, and behind, every body pushed hard for that small "centre of attraction." Surely there is no secret pleasure in endangering the safety of "favourite corns" and the order and neatness of one's toilet.

The ponderous steam-engine was harnessed and ready, the carriages gradually filled, luggage was all packed away, doors were duly banged, and then, off we rushed with our snorting, iron steed puffing forth its long cloud of dingy smoke, and rattling and clanking over its metal rails, right speedily. My companions were not of the sociable, talkative order, but leant back in the cushioned seats with a solemn sense of their own importance, looking vacantly at "nothing particular," until they grew sleepy, restless, and bored (serve them right); so, while "steady and swift the self-moved chariot went," as Southey wrote when steam was not, I amused myself with thinking of how our forefathers travelled in the days gone by, conjuring up times when all travellers "girt with a pair of spurres sharp" took their journeys in the saddle; laughing (quietly) to think what consternation was expressed when the lumbering, jolting, springless coaches were first placed on the shockingly bad roads, and how it was said that they would ruin this (how often thus ruined) country by destroying the demand for boots, spurs, saddles, and bridles, with riding gear generally, and decreasing the trade in horses. Why some parts of this our own "right little, tight little island" were really farther off than North America is now. Our slow, old snails, the carriers were thought such patterns of speed then-a-days that they carried the post and contrived to effect an interchange of letters between York and Oxford in something—but not much—less than a month. There's "post haste" for you! One of the most famous of these old carriers gave rise to the saying of "Hobson's choice" by obstinately refusing to allow his successive patrons to choose any horse but that which chanced to be nearest the stable-door, whose epitaph, written by the great author of "Paradise Lost," says—

> "Here lies old Hobson, Death hath broke his girt,
> And here, alas! hath laid him in the dirt."

Then came the old stage-coaches, and rare lumbering old vehicles they were at first, with their singular old "boots" projecting from the sides of the coach and associated with cramped limbs, highwaymen, and long stoppages in the bad weather; the coachmen and guards of which, in common with all, or nearly all, the passengers, went heavily armed, and full of fear and suspicion, on their tedious and uncomfortable way. Then came the mail and stage-coaches as many of us remember them. Starting early in the morning, with a bustle and stir of hostlers, passengers, idlers, and vendors of all sorts of portable and eatable wares; rattling out into the streets with a jerk and a jolt, over the uneven little round stones, and under the low archway of the coach-yard; the harness jingling and rattling away quite merrily, with now and then the smacking whip, or the sound of the guards' horn as they bowled cheerfully along, the wonder and delight of all beholders. Unless it chanced to be the mail, your driver would be sure to resemble in costume and character, more or less, the jolly old "Weller," but if it was the mail, he and the knowing, laughing, winking, joking, saucy guard would be gorgeous in scarlet and gold, and of a smarter and more active build. How valuable and interesting would a photographic relic of one of the queer old vehicles, with their boots and baskets for outside passengers, now be! Thinking thus, I resolve that the next old stagecoach I meet I'll surely photograph for preservation as a relic; and there are just a few to be met with. Then came that once "impossible" thing, which, like so many other impossibilities—has become so very possible—viz. the locomotive engine on the railroad. And so, we moralise, as time passes, and science derives fresh strength from the growing knowledge of our philosophers, what will be thought impossible? Who will say that among other wonders the colour of nature shall not yet live upon the photographer's plate; all honour to the daring spirits who, undeterred by the sneers of the sceptical, or the ridicule of the ignorant, laboured or labour undauntedly on to achieve their brilliant victories over the so-called impossible.

At last I was on board the boat, with the curling folds of dense smoke from the funnel thereof unwinding in the air, like the form of some ghostly dragon uncoiling itself for flight; and the fierce strong paddles lashing the green waves until they were boiling with futile anger, and white with foam. The deck was crowded with passengers, laughing, chatting, and joking, or smoking and drinking. The dinner-bell soon summoned most of us below, but we soon emerged once more into the fresh sea-air, none the worse for thus refreshing the inner man. The sea was so calm that a plate might have been exposed with perfect safety; and, really, if taken instantaneously, the groups of people would have made a very excellent and interesting picture. Here was a little group, evidently pleasure-seekers, all smiles and merriment. There, by way of contrast, an anxious man—evidently the husband—carefully attentive to a fragile looking and sickly young woman; near them stood a pale-faced, intellectual young fellow, with the traces of deep thought and study in his wasted features: not far off the hard features and unhealthy complexion of a man of business, grudgingly giving up some of the time so precious to his money-loving soul at the repeatedly urged advice of his medical man. Again, here was a stout paterfamilias in the midst of his little family, every member of which were continually and loudly ejaculating, with every appearance of wonder and delight, "Oh! look here pa!" or "Oh! look *there!*" There were mammas frowningly rebuking pretty daughters, who were inclined to be somewhat jocular with strangers, young men in straw hats, or black caps in shape resembling those worn by mandarins in China. How lucky mammas are not omnipresent: but few of the numbers were invalids, more going, wisely, to retain than to regain health; going with myself for fresh air, increased out door-exercise, sea-bathing and freedom from business cares, with which, however, though last not least, I hoped to combine Photography.

A. H. Wall.

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 22nd August, 1860.

The French Photographic Society has given timely notice of its next exhibition, which will be held at Paris, in the month of May next. I hope this will give British artists ample time to produce some *chefs-d'œuvre*, so that their credit may be maintained. It may not be amiss to name in this place what the sons of "perfidious Albion" must do in order to win the suffrages of French critics.

For a long time the department of landscape photography was in a great measure monopolised by British artists, portraiture and architecture being the branches most affected by the French. But lately they have attacked the British strongholds, and, as *they* think, Fenton is outdone by Davaune, and Maxwell Lyte by Camille Silvy. Llewellyn has a formidable antagonist in Le Gray, and Paul Perrier is more than a match for Mr. White. There is certainly a peculiar charm about the landscape productions of these Parisian artists which deserves to be analysed, in order that those to whom it is acceptable may profit by it. If I were called upon to give an opinion as to what it consists in, I should say in a greater picturesqueness, and in better composition; that is, the point of view is carefully selected with an artistic eye, so that the elements of the picture *compose* better. This is doubtless due to the fact that most French operators are artists, and view things with an artist's eye, and you well know how much the artistic faculty helps to make up a picture out of the most unpromising elements. The Frenchman will tell you that English landscapes look as if the operator had no choice of position: that he took this or that view from an unfavourable point because "he could not help it." I do not venture to affirm that the Frenchman is right, but I give you his opinion, so that our brother artists may look into the matter, and see if a hint may not be taken with advantage.

In the great Exhibition of 1855 the landscapes by English photographers excited as much surprise as admiration. They were something new to French art, and they excited French artists to attempt that charming branch of the photographic art. When such well-known operators as Davaune, Silvy, Le Gray, and Perrier essayed their skill the result could not be doubtful. Not only do they think that they have beat English artists on their own ground, but they also flatter themselves that they have raised this branch of photography to a higher position than any of the others has yet attained.

M. Davaune gave us some charming views of *Pierrefonds*, and the groves of *Trianon* and *Versailles*. His name must be familiar to you as one of the two able chemists who have devoted so much labour and skill in establishing the philosophy of "positive printing."

In the same rank as an artist stands M. Silvy. It would be impossible to display more taste and skill than is exhibited in his views of the "*Vallée de l'Huisne*," the "*Gué de la Croix du Perche*," and the "*Porte de l'Eglise de Frange;*" they are truly *pictures* in which we scarcely know which to admire most, the profound poetical feeling of the composition, or the perfection of the detail. M. Silvy practises an excellent method in the execution of his pictures, which we should like to see more generally imitated; his skies are appropriate to the scene, he is not to be satisfied with that lame contrivance of "stopping out," which leaves a bald blank space in the picture; nothing so utterly inartistic would satisfy his taste. This is one of the secrets of his excellence, but he has others, which it is beyond the power of my feeble pen to describe.

M. Le Gray excelled, in the last exhibition, in his studies of trees; but he is no less eminent in portraiture. In each department he exhibited some very remarkable works.

The artistic calibre of Paul Perirer was displayed in his "*Village d'Evian*," his "*Lac de Genève*," his "*Falaises d'Etretat*," and "*Chateau de Chillon.*" There was another view of the *Castle of Chillon* by a Genevese artist of celebrity, M. Nuagnat; a comparison of the two pictures was both interesting and instructive. You might see how the same subject could be treated in the most opposite manner, both in composition and in effect, and still the results be equally satisfactory in an artistic point of view. If my conclusive evidence had been wanting to prove that photography is an art, these views, taken with perhaps identical instruments, would have satisfied the most sceptical.

I have been particular to specify the productions of these photographers, in order that English artists intending to send their works to the next Paris exhibition may see and study them, and take a hint as to the qualities that will be looked for in their pictures, and which, if absent, will expose them to the censure of the Parisian critics.

I will now name a few others whose works may be profitably studied.

Count Aguado, one of the most ardent disciples of photography in France, excels in his *studies of trees*, in which he is, I think, unrivalled.

A collection of *Views in the Pyrenees*, by M. Civiale, and another by Mr. Maxwell Lyte serves to convince us that the subject is unpropitious. The total absence of aërial perspective shows that in those regions, whether hot or cold, in which the vapour of the atmosphere is invisible, good photographic pictures are unattainable. There is no distance. Remote objects, dwarfed by perspective, from the dimensions of those that are near, give an aspect of harshness to the whole scene. It might be worth while to try whether this defect could not be overcome by focussing only the foreground, and thus rendering the distance more indistinct.

I will now pass to the domain of portraiture, and here a widely varied field presents itself, which clearly shows that success in this most important sphere can only be attained by high artistic qualifications. It is in this branch of the photographic art especially, that the talent of the artist or the absence of it, so signally displays itself. It most surely impresses an individual stamp upon his works, which is, in fact, but the reflex of his feeling for art, and his sentiment of the beautiful.

A portrait taken by a sculptor or a painter will differ so much in certain essential features of treatment, as scarcely to be recognisable as being of the same person. The sculptor, who has to produce effect by form and chiaroscuro, will see that those elements are prominent in his portait, and possibly these qualities will predominate. His work will be, not a picture, but a statue; it will perhaps be objected to by many for its cold, solemn air; how the artist can impart this statuesque air to his productions is one of the mysteries of his art; but scattered amid the multitude of other portraits, those by the sculptor are as easily distinguishable as the products of the chisel are amid those of the pencil. The photographic portraits by the sculptors Clésinger and Adam Salomon are the results of an irresistable impulse and tendency, which had their origin in the nature of the human mind itself.

Both these styles, the sculturesque and the picturesque, or the natural, have their respective merits and attractions. It is not necessary to give either a blind preference, for perhaps a portrait of an individual by artists of both classes would be necessary to give a correct idea of a man of genius, of a Humboldt, or a Garibaldi, the sculptor would idealise his model, and exalt the moral, while the painter would give the man under his simple and familiar aspect.

I do not know why it is, but most photographers who succeed admirably in taking portraits of men, yet generally fail in rendering the heads of the fair sex. That the "fair" are the most difficult to pourtray, every artist will doubtless readily admit, and we might, therefore, venture to proclaim him the greatest artist who can produce a perfectly successful picture of one of Eve's fairest daughters. We know very well that ladies have not looked with a very favourable eye upon our art, and we think that they are right in their coyness, for photography seldom plays the courtier to them, certain it has not shown itself a flatterer. However much grace the original may naturally possess, somehow or other, the photographer allows it all to escape. In looking at these graceless portraits you involuntarily exclain, "This artist does not know how to draw."

The execution of photographic portraits has arrived at so high a degree of perfection, that the operator is free to give all his attention to the graces of his art. There are still some prejudices to be overcome, but it must be conceded that a first-rate photographic portait is infinitely more valuable than a third or fourth-rate portrait in oil.

I will venture a few words on architectural photography, a branch of the art in which, it must be admitted, that French artists have from the first shown much tact and skill. Their works exhibit what the painters term "breadth," rather than excessive detail. Sharpness in landscape and architecture is the rock English artists have split upon, and the usual treatment of skies destroys all the harmony of effect necessary to the production of an artistic picture.

I have thought that a few hints as to what are considered defects in the British School of Photography would not be ill-timed when coupled with an invitation to prepare pictures that shall reflect credit and honour on our national status in the black art. It might have been expected that in a country where art is held in such high esteem, and in which so many of the finest productions of modern times have orignated, it might have been anticipated, I repeat, that in such a country, in Germany, photography would have taken root early, and have there attained its culminating point. But as if to confirm the non-practical character of the nation, such has not been the case. Of all countries to which photography has made its way, in Germany it has been received with the greatest coldness, and made the slowest progress. Not that it has been altogether neglected, far from it, but it seems to have been covered with a veil, which few have the courage or the ability to lift. No photographic societies, no photographic journals, no exhibitions, the photographic traveller would find more activity prevailing in the exercise of his art on the banks of the St. Lawrence than on the Rhine. Who ever saw a German photograph? What is it like? Who are the operators, good, bad, or indifferent?

But a little activity is observable now. The process in general use is simply wet collodion. Preserved or dry collodion have as yet done little to disturb the composure of the bearded operators of Berlin or Vienna. To them the sweets of the immortal honey-process are unknown: blissful ignorance, from which may they never be awakened! In vain for them have Taupenot or Fothergill dived into the profundities of collodio-albumen: even raspberry-syrup and extract of malt lack admirers. They stick to portraiture, wisely looking to the main chance. Voightlander and Petzval are not prophets in their own country: they make their lenses there, it is true, but for "exportation only:" a German photographer prides himself upon the possession of a *Ross* or a *Chevalier*, and eyes with supreme contempt the native product; just as the Frenchman thinks a good picture impossible without a German "objectif."

Let me not, however, draw an extreme picture. Germany has its photographers, few it is true, but great in their several walks of art. Would you view the beau-ideal of photographic portraiture, get a portrait by Hanfstaengl, of Munich, or Albert of Augsburg, or Schaeffer of Franckfort, or Severin of Dusseldorf. Perhaps it is owing to his long and severe labours as a lithographic artist that Herr Hanfstaengl so greatly excels as a photographer. For many years he superintended the execution of the *Dresden Gallery*, the very *chef-d'œuvre* of lithographic art: a work, the excellence of which would not be deemed possible unless seen.

At Dusseldorf Michaels is very skilful with the albumen process, his large views of Cologne Cathedral, of the Royal Palaces at Potsdam and Berlin, are truly excellent, and place him in the same rank as your Fenton or Llewellyn.

At Berlin and Dresden, as well as at many other cities, there are several photographers almost solely occupied with copying rare engravings, while at Berlin, Dresden, and Dusseldorf there are others who occupy themselves in copying pictures. Many of the Dusseldorf artists have become photographers in order to be able to make studies from nature. Recently Professor Gude, the celebrated painter of scenes in Norway, was sent to his native country by the Photographic Institute of Elberfeld, to bring back studies for new pictures.

Stereoscopic photography is not yet carried on to the extent it has flourished in France and England. Groups and foreign views have found the readiest sale; but recently this department of the art has been cultivated by Ost of Vienna, Schauffuss, of Leipzig, and Schnieder of Frankfort, and their productions prove that they can understand the resources and appreciate the applications of this branch of art well as any of their foreign competitors.

If photography possessed its patron saint in Germany, doubtless reynard the fox would be elected to that honour. A set of cunning, crafty knaves, some twenty in number, have reaped a rich harvest in selling recipes for *secret* processes, which were, in truth, known to everybody except their unfortunate dupes. Their career has been brought to an abrupt termination by the establishment of two or three photographic journals, which have made known the *secrets* of every process.

An exhibition is talked of to take place next year, *perhaps*, at Weimar: *nous verrons*.

M. Maumené has experimented on the solubility of carbonate, sulphate, and phosphate of lime in ammoniacal salts If we take a solution of chloride of calcium, and add to it carbonate of soda or potassa, we obtain a bulky precipitate of carbonate of lime; if to this we add a solution of hydrochlorate of ammonia it is immediately re-dissolved; it is the same with sulphate and phosphate of lime. If we take a natural carbonate of lime, and put into distilled water with a morsel of sal-ammoniac, for a few moments only, and then filter it, the water that passes through gives an abundant precipitate with oxalate of ammonia. A bone allowed to digest for a few hours in a large quantity of sal-ammoniac becomes as soft as if immersed in an acid. In nature, where most waters contain ammoniacal salts, arising from organic detritus, the calcareous salts may be decomposed, and cause deposits, stalactites, etc., by evaporation. In agriculture there is nothing to preclude the supposition that the salts of lime are assimilated by vegetables, by the solution of the lime in the ammoniacal salts of the manure.

At the present time a little fact in connection with the natural productions of Sicily may possess more than a passing interest. The plant known to botanists as the *Citrus lumia* abounds in Calabria and in Sicily; it produces a fruit, which in external appearance, greatly resembles the lemon: but while the latter yields an acid juice, the *Citrus* has a very delicate sweet flavour. The rind of this fruit exhales a very agreeable odour, very different from that of the orange or the lemon, but which may be compared to the odour of the essence of bergamot; this latter, however, is stronger and more pungent. The crude oil obtained by pressure from the rind of the fruit popularly known as the *Lima di Spagna*, has a very deep yellow colour; but, upon distillation, the colouring matter remains as a residue in the retort, and the essential oil passes over in a colourless state. That portion of the essence collected at a temperature of 356° F. is a carburet of hydrogen, the formula of which is $C^{20} H^{16}$; the first and last portions of the distillate contain oxygenised compounds. This essence is insoluble in water, very little soluble in alcohol, but readily soluble in ether and in sulphide of carbon: at a temperature of 64° F. it has a density of 0·853, analysis shows it to be composed of

Carbon	87·89
Hydrogen	11·98

The formula $C^{20} H^{16}$ requires

Carbon	88·2
Hydrogen	11·8
	100·0

With alcohol and nitric acid it forms a hydrate; hydrochloric acid combines with the essence, producing liquid and crystalline compounds; the crystallised compound is a bi-hydrochlorate, the composition of which is represented by the formula

$$C^{20} H^{16}, 2 H Cl.$$

THE NEW MODIFICATION OF THE COLLODIO-ALBUMEN PROCESS.

Sir,—The very surprising discovery made by Messrs. Petschler and Mann, and communicated by them to the last meeting of the Manchester Photographic Society, will of course engage the attention of every photographer, and more especially of those who use dry plates. The collodio-albumen process, as usually practised, has been generally considered more certain and reliable than any other, the only drawbacks being the troublesome manipulation, and the limited time the plates would keep after sensitising in the aceto-nitrate bath. It is now discovered that the albumen need not be iodised, but should contain about two grains of chloride of sodium (or ammonium) to the ounce; that the aceto-nitrate bath may be dispensed with as wholly unnecessary; that the plates when prepared are perfectly insensitive to light, and will keep indefinitely; that they can be rendered sensitive at any time, by being simply washed thoroughly for one or two minutes in a stream of water, or under a tap; that the plates develope very quickly without any muddy deposit, presenting negatives which are remarkably clear and bright; and lastly, that although blisters are not entirely got rid of by this process, they assume a different character to those upon collodio-albumen plates, as they disappear when the film is dry, and do not again rise under development.

Here, then, is a process which entirely supersedes the old collodio-albumen, and seems almost identical with that Fothergill, with which we will now compare it. In both processes the plate is coated with collodion, and sensitised in a 35 grain nitrate bath. It is then removed, and in the collodio-albumen process the whole of the free nitrate is washed off, while in Fothergill's most operators only dilute the free nitrate, though others proceed as in the collodio-albumen, opinions being divided as to which course is the more correct. The plate having been well drained, the next step is to cover it with prepared albumen. This consists of three parts of white of egg to one part of water, in both processes, this being the proportion prescribed by Mr. Fothergill himself in his letter to *The Times*, and to the London *Photographic Journal*. Each ounce of this mixture is to contain two grains of pure chloride of sodium (or of ammonium). A sufficient quantity of the prepared albumen is poured on at the upper end of the plate, and let flow down to the lower edge, and off into the waste pan, and then a second portion is poured on and worked about the plate for at least one minute. This is then poured off to be used for the first coating of the next plate. Up to this stage the manipulation of both processes is alike, or nearly so; but now arises the point of difference. In the collodio-albumen, the plate having been drained for half a minute, and reared on blotting-paper till surface-dry, is either baked in an oven, or film-dried before a hot fire. In Fothergill's the plate is washed in several waters in a flat dish, or under a tap, and then dried in the same manner as the other. The one retains its coating of albumen, and is insensitive to light; the other has had its albumen coating washed off, and is extremely sensitive to light, The former is not ready for exposure, the latter is. To render the collodio-albumen plate sensitive, it must receive a thorough washing, to free it from excess of chloride of sodium over the pure and insoluble chloride of silver contained in the albumen coating. The Fothergill plate has already been rendered sensitive by the same process of washing performed while the albumen was still wet. Both are now brought to the same condition; and it will be a nice point to be decided by future experiment, which is the better method, and which produces the best results. If it shall be found that the collodio-albumen retains that superior certainty over the Fothergill plate which has always been claimed for it, there can be no doubt that it will be the process generally preferred. The insensitiveness of the plates before washing will ever constitute an important feature in their favour with tourists, especially to the continent. Meanwhile, each process will throw light upon the other, each is susceptible of obvious modifications, and when these have undergone the test of time and experience, we shall eventually be in possession of a mode of preparing dry plates which will satisfy all the wants of the landscape photographer, combine simplicity of manipulation with certainty of result, and possibly rival wet collodion plates in rapidity.

It is a matter of great congratulation that the aceto-nitrate bath in this process is now got rid of, not only on account of the expense and trouble attending its employment, but as Mr. Sidebotham remarked, because the ever uncertain condition of that agent was a great evil. The large quantity of iodide and bromide used in the albumen will now also be saved, and the whole process reduced to the simplicity of Fothergill's. Indeed the two methods may be henceforth considered as identical, the operator being left to his option of washing the albumen, either whilst wet or after it has become dry. This in fact is the only difference (if difference it can be called), between the two processes. The analogy of the collodio-albumen proves clearly that all the free nitrate of silver should be washed from the film, and that what is termed the "four drachm washing" (which originated with Mr. Keene, of Leamington), should be given up. Mr. Fothergill himself washes the film as in the collodio-albumen process, so that it may be taken for granted that both processes are identical up to the stage when the plate has been finally coated with albumen, which if it be desired to render the plate immediately sensitive, can be at once washed, or if the intention be to keep it insensitive till wanted at some future day, can be dried and kept indefinitely.

There is still one question which remains to be settled. The advocates of the collodio-albumen process have for the most part declared that "any collodion will do" for the plates to be prepared by it, whilst some have qualified this assertion by adding, "provided it be sufficiently thin," and others again have said that "a good positive collodion yields the best results." There can be little doubt that an old thin negative collodion answers for it very well. But we all know that "any collodion" will not do for the Fothergill process. It would be amusing, if not instructive, to collect from the various journals the different opinions put forth on this head. Recently a correspondent in one of your contemporaries, stated that he invariably employed for this process collodion that from age had become quite insensitive, with the happiest results, and that he had frequently obtained excellent negatives with refuse collodion three years old! Without endorsing this opinion, I believe it may be affirmed that old collodion answers better than new, and that for both processes the collodion should contain at least half a grain of bromide to the ounce. However this may be, if it shall be found that collodion which is in every respect suitable for the one process will not answer for the other, the reason must be sought in the difference between the albumen coatings, the one being washed off whilst wet, the other being retained and dried on the surface, and although washed afterwards, still left subsisting unattenuated as at first. The investigation of this question will be interesting, and may probably decide us in adopting this modification of the collodio-albumen process over every other, as offering on the whole the largest balance of advantages.

R.

PARALLEL PROCESSES

Sir,—At a recent meeting of the Manchester Photographic Society Messrs. Petschler and Mann brought forward a new modification of the collodio-albumen process; which modification appears to me to be simply a roundabout way of preparing a Fothergill plate, the principal difference being that by the new method the film is allowed to dry before the superfluous albumen is washed off, for this is undoubtedly the effect of the so-called sensitising bath of water. In illustration take a synopsis of the two processes:

Fothergill.	New Modification.
1. Coat and sensitise ...	do.
2. Wash	do.
3. Coat with albumen ...	do.
4. Wash	Dry.
5. Dry	Wash.
6.	Dry.

Thus the Fothergill has the advantage as regards simplicity, and I must leave it to others to show wherein is the advantage of the complication.—I remain, sir, yours respectfully,

Analyst.

[Supposing the conjecture of our correspondent as to the identity of the two processes to be correct, he still overlooks, we think, the important advantage gained of preserving the prepared plates without any reference to the exclusion of light, and rendering them sensitive at any time when required without any more troublesome process than the simple washing, which may be effected in the bed-room of an inn. We cannot but regard the discovery as a very important and valuable contribution to our knowledge of dry processes.—Ed.]

Photographic Notes and Queries.

DARK-ROOM WINDOWS.

Sir,—If your correspondent "M. M. D." will prepare a mixture of 1 oz. of soft soap boiled in half a pint of rain water, and when hot mix thoroughly with a pint and a half of boiled linseed oil, then have ground together some orange chrome, and a small portion of orange lead in boiled oil, and colour the first-named mixture by mixing a sufficient quantity of the latter. This may be applied with a paint-brush, and as soon as the first dressing is dry go over again, and a third time if requisite. I have a piece of calico (inserted in my tent for out-door work) thus prepared, which will bear the strongest sunshine without the negatives being fogged; it is of only one thickness and admits the light freely, is thoroughly waterproof, and very pliable.—I am, sir, yours, &c.

J. S. Overton.

Sir,—In answer to your correspondent, "M. M. D.," I beg to say that I have found the following plan of filling the pores of yellow calico answer admirably. Take a solution of gutta-percha in benzole (fifty grains of the former to one ounce of the latter), and to every ounce add thirty grains of finely-pulverized yellow-ochre, saturate the calico by brushing or immersion, and when dry, which will be in about ten minutes, it is not only free from pores, but perfectly waterproof.—I am, sir, your obedient servant, L. Daft.

Sir,—If your correspondent in last week's News, "M. M. D.," will have a frame made to fit his window, say an inch and a half, or two inches broad, with an overlapping slip all round *inside* to prevent the entrance of white light, and for convenience of putting away made to fold in the middle like a book or a double slate, with another slip down the back of this joint *outside*, and on the two leaves of this first strain tight and nail down some coarse muslin, and then over this paste neatly one layer of yellow paper, he will find all white light perfectly excluded, with very little obstruction indeed to illumination. Three wooden hasps, or buttons, attached to the *window frame*, one on each side and one at the bottom, keep it in its place when in use, and two iron or wooden supports and a button attached to the wall of the operating-room keep it out of harms way when not in use. I also tried yellow calico, fold upon fold, but, like your correspondent, found it not only bulky and heavy, but frequently ineffectual, as the light outside varied. The yellow paper to be obtained at photographic chemists is perfectly impervious to white light.—Yours, respectfully, O. E.

PLATE-CLEANING SOLUTION.

Sir,—Can you give me formula for a plate-cleaning solution that can easily be rubbed off *when dry*. The ordinary tripoli powder must be rubbed off whilst moist, and this I find a great disadvantage. Some time ago I placed several glasses in a strong solution of common soda and water leaving them there until a large number had been collected, so as to clean all at once. I find several of them covered with a film which nothing will remove, others are *spotted*, and on taking a negative on one of these last it prints just as if the negative had abounded with the ordinary comets. I have tried nitric acid, cyanide of potassium, and other cleansing agents, but nothing removes them. I am told they arise from *lead* in the glass, is this so? the glass is that called crystal sheet, a very white glass, I believe of foreign make. Can you tell me the cause of such *film* and spots; the means of preventing them in future, and of cleaning those I have now got? If I could get a cleansing solution that I could rub off at any time, wet or dry, there would be no need to leave plates so long in the soda solution.—Yours,

Photog. Juvenis.

[We do not like the use of alkalies for cleaning plates. Strong alkalies act on the surface of some kinds of glass, and we have found glasses quite unfitted for photographic purposes when submitted to a prolonged soaking in soda and water. There are several cleansing solutions sold ready prepared. The following is one of the most effectual we know:—

Water ... ... 1 ounce.
Alcohol ... ... 1 ounce.
Nitric acid ... ... 1 drachm.
Fine tripoli *quantum suff.*

Use sufficient tripoli to make the solution the consistency of thick cream, and apply it with a woollen rag, rubbing the plate well all over. It may then be removed at any time with one linen cloth and polished with another. If the plates be dipped into a saturated solution of common salt in warm water, and put away to dry, the salt will crystallize and may easily be removed by rubbing with a linen cloth, which will bring away at the same time all dirt from the surface of the glass. For plates on which the film has been suffered to dry there is nothing better than a little waste collodion. The crystal sheet-glass is very good for covering pictures; but should never be used to takes pictures on. Throw away or use for other purposes all the plates that have been soaked as you describe, you will only waste time and material in attempting to clean them.—Ed.]

PRESERVING PLATES FOR A SHORT TIME.

Sir,—It often happens that an amateur photographer, who has a wholesome dread of tents, photographic out-door messes, badly made, water-tight (?) baths, wishes to take a view, say, half an hour's walk from his dark-room; now, is there such a thing as a semi-dry or moist process which would keep the plate in a damp state for about an hour? I have kept a plate prepared by the linseed process for half an hour with success, but beyond that time it becomes patchy in developing owing to the partial drying up of the linseed. As a dry process the linseed answers well, but then there is the extra trouble in washing, drying, prolonged exposures, and developing unfortunately under exposed pictures. This is all very well miles away from a dark room, but to prepare dry plates to go half a mile does seem rather absurd. In some negatives which I have taken with the wet linseed, which have been kept quite half an hour, the development is perfect, in others, perhaps delayed to three-quarters of an hour, the bottom a negative always spoils the rest by not printing till the other is quite done. The exposure is very little different from the ordinary wet negative, as I wash but little. If some of your numerous correspondents could initiate me I should feel myself much indebted to them.—Yours, Neg. Devel.

[There are several processes involving but little trouble which might answer our correspondent's purpose, such as the use of honey, golden syrup, glycerine, &c. A collodion film containing a full proportion of alcohol, simply washed with distilled water on removal from the nitrate bath will remain without dessication for some time in cool weather. A piece of blotting paper the size of the plate, wet with distilled water and placed at the back of the plate will retard drying considerably in warm weather. Perhaps some of our correspondents who may have had experience in keeping plates a short time can inform you.—Ed.]

DIFFICULTY IN THE FOTHERGILL PROCESS.

Sir,—Being a subscriber I venture to make this enquiry—I have lately exclusively practised Fothergill's process, and am generally satisfied with the results. One difficulty with it, which I have not seen mentioned before, is that when insufficient exposure has obliged more than usual development, in order to give sufficient intensity, I find upon varnishing the picture that the deposit is carried by the varnish, and forms streaks and stains; can you tell me how to remedy this. What is the best varnish, and how should it be applied? My developing mixture is a weak pyrogallic and citric acid solution, say one ounce and a half of the former to half an ounce of the latter, per ounce of water, and to this I add very little of a five grains per ounce silver solution.—Your obedient servant, J. A.

[The defect described by our correspondent would suggest that an excess of silver solution was used in the development, which was also carried too far. The best varnish for negatives generally is a spirit varnish applied with the aid of heat; but under the circumstances described, possibly a benzole or "crystal" varnish might remedy the evil. Possibly some of our correspondents may have met with a similar difficulty.—Ed.]

IMMORAL PHOTOGRAPHS.

Sir,—Your correspondent "△," in his laudable attempt to suppress a great and and serious evil, little thought of the pain he must occasion by throwing the black veil of suspicion over two such respectable neighbourhoods as *Clapham* and *Kentish Town*. In the latter place I have a photographic printing establishment, and being commissioned to print a large number of eminent persons' portraits for publication, it is calculated to injure my reputation if supposed that I am in any way engaged in printing photographs at all objectionable to society. Will you kindly extend your protecting shield over me by the insertion of this letter? and thereby prevent erroneous impressions which may be inimical to my position as a photographer.—I am, sir, yours most obediently, W. Gregory St. George.

31, *Gloucester-place, Kentish Town*, N.W.

OPAQUE VARNISH FOR TRANSPARENCIES.

Sir,—Can you furnish me with a receipt for an opaque varnish suitable for stereo-transparencies as a substitute for ground-glass. I have tried the negative varnish chilled, but it does not dry even; also the same with some white wax added to it, which I don't find successful.—I am, sir, yours obediently, G. S. P.

[We do not know of any good opaque varnish sold for backing stereo-transparencies. There is some difficulty with some spirit varnishes to get them to dry when applied cold with an even dull film. Try white wax in a benzole varnish, usually sold under the name of "crystal varnish." An excited collodion plate, giving an opalescent film has been recommended for the purpose. It should be washed to remove the free nitrate of silver.—Ed.]

Talk in the Studio.

The Photographic No-season.—In the metropolis, and from every part of the country, there is a general cry that the season has come and is fast going, but no photography has been done. Many of the first professional photographers, both in town and country, have been less engaged than they are usually in the winter season, whilst amateurs complain that owing to the wet weather, dry plates have, in some instances, been kept six weeks in their dark slides, without one favourable opportunity for exposure.

Photographic Volunteers.—If photography has suffered, the rifle movement has probably gained, by the unpropitious season, for we observe many names prominent amongst the volunteers, who would scarcely have been seduced from the camera if the season had been more propitious. The names of Roger Fenton, Dillwyn, Llewelyn, B. V. Turner, Horatio Ross C. G. H. Kinnear, A. H. Wall, M. Hannaford, and others all very familiar to photographers, are now becoming as familiar amongst riflemen.

Messrs. Cotton and Wall, well-known as amongst the most successful of our metropolitan portraitists, are just engaged in the production of a somewhat novel and extentsive work, being nothing less than an album of the portraits of British Volunteers, every corps, in all parts of the country, being represented. We have seen some hundreds of portraits, of very great merit as photographs, and possessing, as a whole, a historic interest altogether unique.

Poisoning by Cyanide.—A lady was found dead a few days since from the effects of cyanide of potassium, a phial of which, three parts full, was found on her person. It had been purchased for photographic purposes by a brother-in-law of deceased.

The Eclipse.—Various photographs of the eclipse are now exhibited for sale in the metropolis; one possessing the singular effect of representing the sun as a dark crescent amid luminous clouds.

To Correspondents.

Stereoscopic Exchange Club.—Emil Seelig, and others, are informed that immediate attention shall be given to this subject. Apology may be necessary to some of our correspondents on this matter; owing to circumstances it is unnecessary to mention, we fear, from the tenor of communications we have received, that the Exchange Club has been somewhat neglected of late. Any of our readers wishing to join the Exchange Club, will please communicate particulars at their earliest convenience, as we hope shortly to publish a list of names.

T. R. F.—A spirit varnish is the best for protecting negatives; and should always be applied with heat. (See advertising columns).

P. A. R.—For stereoscopic portraiture we prefer a twin lens camera. You may make the portrait lenses available for views by placing diaphragms between the front and back lenses of the combination. (See answer to Stereo.)

Negative.—We suspect there is some error in the statement to which you refer; but as it did not pass through our hands, we have not at hand the means of rectifying it with certainty. It appears to us, that since M. Gaudin is proposing to preserve *sensitive paper*, not to fix prints, it is his intention to place the excited paper in a bath of salt and water on removing it from the silver solution, and so convert the free nitrate into a chloride, which would doubtless aid in preserving the excited paper, but would, we strongly suspect, materially injure the beauty of the resulting print. We prefer toning first in an alkaline gold bath, and then fixing in strong fresh hypo.

I. S. O.—We are obliged to you for further particulars regarding the "new discovery."

E. H. Heyes.—Your print is very much over toned. On referring to the formula to which you allude, we find the solutions much stronger than is desirable for general use. Make your silver bath of a strength not greater than from sixty to eighty grains to the ounce of water, but keep it up to that. In toning, remember the quantity of gold must be proportioned to the number and size of the prints to be toned; one grain of gold being sufficient for six or eight prints 8½×6½. The quantity of water to be added is unimportant; it must be sufficient to allow the prints to float about freely. At least twice the quantity of water you have been using is desirable, as in a weak solution you have the toning more under control. Add about twenty grains of phosphate of soda to each quantity of solution containing a grain of gold, and omit the soda-bath after. Use a more highly albumenised paper, and a little more vigour in the negative. Your hypo. solution will do. Do not allow the print to reach the slaty blue tone in the gold bath; remove it when it has attained a deep purple, and your finished print will be a warm purple brown.

M.R.—Your print is a valuable illustration of the value of iron development, here is detail, roundness, and beautiful modelling. We shall be glad to see the print to which you refer.

F. G. L. I.—The quantity of soluble cotton to be used must entirely depend on the purpose for which the collodion is required, and the quality of the cotton. As a general rule collodion for positives requires less than that for negatives; and cotton made at a low temperature is soluble in less proportion than that made at a high temperature. From three grains and a half to four grains of pyroxyline made at a low temperature, will generally be found sufficient for positive collodion; five or six grains, or even more, of pyroxyline made at a high temperature, will not be too much for a collodion for negative purposes. About 120° fahrenheit, and under is regarded as a low temperature, and about 150° fahrenheit a high temperature. 2. All collodion simply iodised, rapidly loses sensitiveness; bromides materially assist in preserving sensitiveness. 3. The condition of your collodion is probably caused by decomposition of the pyroxyline. It is worthless for ordinary purposes. It may sometimes be used in small proportion with a collodion which is quite new.

Bertrand.—The use of powder colours for glass positives does not require the education of an artist; nevertheless, the more knowledge of artistic effect &c., you bring to your work the better it will be. Colour first on the collodion film, then varnish and retouch with colour. Water colours are not suitable for the purpose.

Foliage.—You can add a bromide to your simply iodised collodion. The bromides of ammonium or cadmium are the most soluble in alcohol. Make a solution of a definite strength, and add a small portion to your collodion, about half a grain to the ounce of collodion will be sufficient for most negative purposes. It is usually added to the iodising solution. Various makers announce bromo-iodised collodions.

W. W. T.—Your misfortune is not an uncommon one; but there is no remedy but to take another negative. If you cannot obtain one from the original again, you must copy one of the prints you say you possess. If you are artist enough to do it well, you may possibly improve the picture a little by adding a few clever touches, to give vigour, which will be reproduced in your new negative, and of course in subsequent prints. The cause of the breakage was doubtless the unequal expansion of the glass when exposed to a hot sun. Never take a photograph you care about preserving on crown glass, good patent plate is the only safe glass for the purpose.

Stereo.—It entirely depends upon the result you wish to produce. If you wish to produce a toy that will startle by the wonderful relief it presents, you may increase the angle; but if you wish to produce simply the amount of relief that would be seen by the human eyes, then about 2½ inches is the proper distance. We prefer the bi-lens camera for the purpose.

Edmund G.—Your yellow glass must incline to an orange tint, a light or primrose yellow will not do. Two or three thicknesses of deep yellow glazed calico will answer perfectly for a time; but as the yellow will have a tendency to fade, you must look to it from time to time, and replace it when it begins to lose colour. Do not be afraid of having plenty of light in your "dark room" so long as it is non-actinic. More damage is done frequently by working in the obscurity of a room in which it is next to impossible to see anything, than is to be apprehended from a large amount of yellow light. (See answers to M. M. D. in Notes and Queries.)

Black Jack.—The process referred to was suggested by Mr. Macnair some months ago at a meeting of the Photographic Society of Scotland. It consists in using brewer's wort in lieu of any of the preservative agents now in use, and is used we believe, in just the same way. We cannot give you further details now; but will refer.

Phos.—Read *Ackland's Hints on Fothergill's Process*, an invaluable little treatise issued gratuitously by Messrs. Horne and Thornthwaite. You will find the whole process most simply described by a most scientific and successful manipulator. With proper precaution you may keep your plates for months.

T. C.—The firm you mention we believe to be highly respectable but will make further enquiries and communicate with you.

J. H. M.—Is thanked for his communication, which shall find an early place.

Glasguensis.—We believe it is not patented, and hope shortly to be able to give some details, as we are at present in communication with the inventor with that purpose.

T. E. R.—The indexes are contained in the last number of each volume, *i.e.*, in 36, 52, 78, and in the number to be issued next week. 2. "The Photographic Teacher," See our advertisement columns.

Rev. J. J. Brown.—In our next.

Dark Room Windows.—In addition to answers to M. M. D. in another columns, W. A. Young recommends two coats of a preparation containing equal parts of burnt and raw sienna ground in oil. This he states will not materially interrupt luminous rays, but will render them non-actinic.

T. Perry.—Try proceeding as for a positive, giving a little longer exposure, developing with iron, and subsequently intensify with pyrogalllic acid and silver. We shall give some details of this process shortly.

Thomas Bailly.—If your wants as stated to us are embodied in an advertisement, and inserted in our columns, we have no doubt but you will receive many suitable applicants. We cannot help you otherwise.

One in a Fix.—You have surely made a mistake. The print you forward cannot have been fixed; by some oversight you have either omitted the immersion in hypo. altogether, or put the print into something you have imagined to be hypo. This was our impression on first looking at the print, and as it lies before us it is rapidly blackening in the sun.

The Dictionary of Photography, Critical Notices, and other articles in type are deferred until next week.

THE PHOTOGRAPHIC NEWS.

Vol. IV., No. 104.—*August* 31, 1860.

THE DISCOVERY IN THE COLLODIO-ALBUMEN PROCESS.

We have just been favoured by Mr. **Ackland** with details of some interesting and instructive experiments in connection with this discovery, and have inspected the negatives produced. The experiments most satisfactorily verify the statements of Messrs. **Petschler** and **Mann** and other gentlemen, who state their results at the meeting of the Manchester Society; but they go further, and offer some important suggestions as to the details of manipulation most likely to lead to successful results.

Mr. **Ackland**, as is well known to most photographers, is a careful experimentalist, and thoroughly well versed manipulator in the Forthergill and Collodio-albumen processes; his results are therefore well worthy of attention. His first experiment was with a plate prepared in all respects as described by Messrs. **Petschler** and **Mann**; the final washing to sensitize being effected by holding the plate beneath the flow from a tap of common water for one minute. An exposure of one minute in a moderate light, with a three-eighths stop gave a picture slightly under-exposed, and with considerable patchiness and inequality. In the next experiment the plate was soaked for three or four minutes in water to effect the final washing, and after a similar exposure, presented the defects of the first in a less marked degree. The next plate in its final washing was suffered to soak in water for half an hour, so as to effect the most entire removal of all soluble matter. The result of a similar exposure was most satisfactory. The film was more sensitive, the development was even and clean, and the picture in all respects satisfactory.

The conclusion is, that a few minutes washing under a tap may not in all cases be sufficient to remove all soluble matter, and then produce the highest degree of sensitiveness, and ensure even development. The soaking for a sufficient period in no way renders the process more troublesome; but it does give additional certainty as to the best results.

The collodion with which these plates were prepared, was iodised nearly six months ago with equal proportions of iodide of cadmium and iodide of potassium, without any bromide: it is now as red as blood. The dry process which will with collodion so old give good negatives with one minute's exposure, not in sunshine, but with merely a moderate light, promises to be of the utmost value to all dry collodionists.

The negatives exhibit all the characteristic beauties of the collodio-albumen process in crispness and exquisite gradations; the foregrounds possessing the utmost vigour without the slightest loss in the distance.

Mr. **Ackland** intends to experiment further in the same direction, and we hope to be able to place before our readers details, not only of the printing character of the negatives, but also of their keeping qualities.

THE POSITIVE COLLODION PROCESS.

BY F. B. GAGE.

Under the head of "Old processes analyzed, criticised, and systematized," Mr. F. B. Gage, an American photographer of considerable experience and intelligence, gives the following remarks on the Positive Process, or Ambrotype Process, as practised in the United States.

He introduces his subject by stating his dislike to the Positive Collodion Process, "because it usurps the place of the Daguerreotype, and would also usurp its honours." In common with a large portion of the American Photographers Mr. Gage hopes for, and believes in, the return of a period when the "Ambrotype" shall be superseded by the Daguerreotype, the exquisite delicacy and vigour of which they still regard as far surpassing in beauty all other products of the camera. The rage which appears to exist in the States for Collodion Positives he regards as an epidemic, which must exhaust itself. "The fever is in the veins of the public," he says, "and must have its run, as the doctors say, and work the system clear. There is no use in trying to stay it, people will have cheap Ambrotypes just as long as they are made, or until they learn by experience what such pictures are. But this folly of cheap pictures will eventually kill itself, and a more settled and substantial era arrive." He then proceeds to the details of the Positive Collodion Process:—

The first thing to prepare is the nitrate of silver bath, which should be prepared with a great deal of care. In the first place, it is all-important to procure silver made from pure metal, and manufactured by *honest* as well as *capable* chemists. More than nine-tenths of the silver sold in market will produce objectionable lights in the picture, while that which is absolutely free from organic matter and alloy will give uniform results. It is necessary for the bath to be constructed according to scientific principles, and for that reason it is better to discuss the principles first, and make the bath afterwards. It should be known to every operator that the deep shadows in the picture are governed in a great measure by the bath and developing. Supposing that I have a sample of collodion which can be worked in sixty- or a thirty-grain bath: if I were to take a picture in the sixty-grain bath the picture would have overdone lights with underdone shades. The lights would be overdone before the deepest shadows would appear. This would not only arise from the bath being too strong at the time of silvering the glass, but also from there being too much silver present during the *development* of the picture. If, therefore, the plate be removed from the bath and exposed, and, before development, be immersed in a thirty-grain bath for a few seconds and well drained, the result will be far different. There will be less contrast between the lights and shades, and the results will be more certain. Now, let another plate be immersed in the same sixty-grain bath, and after silvering remove it, and after or before exposing, it matters not which, immerse it in a fifteen-grain bath, and on developing it we shall have a still different result. There will be very much less contrast and much more harmony in the whole picture. This arises from the fact that there is less silver on the surface during development, and for that reason there is more time for the shades to come up. The high lights do not flash up instantly, they grow up under the developing so gradually, that the shades "lock arms and keep them company," seeming mutually pleased with each other.

It is, therefore, necessary for the operator to know that nature has established a law of this kind, and he should have this law reduced to a rule, and that rule ever present in his mind. It is in this wise :—

Rule 1st.—The more silver the more contrast.

Rule 2nd.—The less silver the less contrast.

The point, therefore, to arrive at is, where will there be just enough silver to produce just enough contrast? for it is evident that the silver might be reduced so far that there would not be enough to produce the proper degree of contrast. This point is a delicate spot to arrive at if any one buys his collodion and finds it of uncertain construction and with an unknown quantity of iodizing; if, however, he makes his own collodion, he can govern these results at will. The bath which I am using at the present time is constructed as follows :—

Pure nitrate of silver, in crystals ...	30 grains.
Iodide of potassium	¼ grain.
Water, distilled, or rain	1 ounce.

After these ingredients are all thoroughly dissolved there should be added one drop of nitric acid to each three ounces of solution. The bath should be made in the dark, as the iodide of silver becomes insoluble if exposed to strong white light, so that the bath would not become thoroughly saturated. Let the bath stand, and shake it up occasionally, for twenty-four hours, after which it may be placed in strong sunlight for a time, or used at once, as occasion seems to require.

After the bath is made and filtered it is well to immerse a coated plate in it, and let it remain a few hours; if, on removal, it appears that the iodide of silver has been nearly dissolved out, others should be coated and placed therein until the bath becomes saturated with iodide, and the glass silvers nearly white and even. To keep this bath in order it is only necessary to keep it away from the strong light, and put nothing but clean-coated plates into it. Nothing else should be used. Acetic acid should not be employed in the bath even if it should be used in the developing, for if it be present during the time of silvering the glass it injures the lights. Do not put in any patent anti-fogging solution or anything of the kind. If you should happen to get too much acid in the bath there are two ways of remedying it. First, you can make more solution without acid, and mix it with that already made, thus reducing the proportion of acid. Or a very small quantity of sal soda (common washing soda) dissolved in water may be added. This is not as good as the first way, as carbonate of silver in the bath is not desirable in the positive process. It is apt to convey an element into the bath that will degrade the lights and not give the best results. Ammonia, or caustic potash, should never be used in the positive bath to neutralize it, as they give too much transparency to the shades and injure the purity of the lights. This is proved by a multitude of experiments all tending to the same result.

(*To be continued.*)

SCIENTIFIC GOSSIP.

A very remarkable account of the occurrence of arsenic in a drinking water has just been communicated by Mr. Church to the *Chemical News.* Our readers may not generally know that the presence of this deadly poison in water is now attracting some considerable attention, in consequence of one of the popular schemes for deodorising the sewage of London, being the employment of a compound, perchloride of iron, which contains considerable quantities of arsenic as an impurity. This arsenic would, in the case of the employment of perchloride of iron as a deodoriser, ultimately find its way into the Thames, where, according to Dr. Letheby, upwards of a hundred weight and a half of arsenious acid would be daily cast, and oscillating between the ranges of the tide would there accumulate, making the water more and more poisonous until the danger might be beyond a remedy. Nor is the mere fact of the arsenic thus thrown into the river, and thence finding its way into the water with which London is supplied for drinking purposes the only point of interest from which photographers will regard this question. Doubtless they will not regard with much complacency the fact that they and their families may possibly be compelled to drink what we have hitherto considered to be a slow but deadly poison; but we are justified in thinking that they will be no less alarmed at the effects which this water may have upon their collodion pictures and positive prints if long used. Experiments which we made some years ago showed us that arsenic in the washing-water employed for removing hyposulphite of soda from paper positives exercised a marked and prejudicial effect upon the tone of the picture, and we fancy that prints so treated have shown great want of permanency. In addition to this it has recently been discovered that arsenic exercises a strong effect when employed in the collodion process, and doubtless further experiments will show that this powerful agent is capable of introducing other sources of failure than those here mentioned. On these accounts the presence of arsenic in a natural water supply is of especial interest to photographers in other ways than the mere possibility of their having to drink it. Pedestrian and other tourists in the lake districts of England cannot fail to have had their attention drawn to the prominent mountain, Black Combe, in the southern part of Cumberland; although from the fact of its being on the confines of the neighbouring mountain ranges, it is not so frequently visited as the beauty of its scenery, and the interest attached to its mineral treasures would deserve. From the northern and western side of this mountain numerous streams or *becks* originate; one of these, Whitbeck by name, fed by streams rising from the ground, at an elevation of about 900 feet above the sea level, exhibits a marked peculiarity. On issuing from the ground the reaction of the water to test paper was faintly, but unmistakeably alkaline; on testing it after ebullition the effect was more decided. This arose evidently from the disintegrating granite, which is so plentiful in its neighbourhood, and through which the water passes in its course. A large and deep pool, in the course of the Whitbeck towards the sea, shows the colour of the water to be a rich, clear, greenish blue. On examining the water, it was found to give distinct indications of arsenic. This element, which here probably exists as an alkaline arsenite, occurs not only as a trace, but in determinable quantity. The arsenic is most probably derived from veins of arsenical cobalt ore, through which it percolates; for, on ascending the gulley, a few yards above the source of the Whitbeck, we arrive at the entrance of a mine which is very rich in this arsenical ore. This arsenical water is habitually used, for every purpose, by the inhabitants of the little village of Whitbeck. Its employment, however, does not give rise to any symptoms of arsenical poisoning, but rather to the effects which are observed in Styria, amongst the arsenic-eaters there. When the railway was being carried past Whitbeck, the first use of this water produced the usual marked effects on the throats both of the men and horses employed on the works. The soreness of mouth from which they at first suffered, soon, however, disappeared and in the horses gave rise to that sleekness of coat assigned as one of the effects produced by the administration of minute, but repeated doses of arsenic. It is a question how far the rosy looks of the Whitbeck children, and the old age which a large proportion of the inhabitants of the village attain, are to be attributed to the arsenic present in the water they drink.

We give a problem of some considerable interest to be solved by our scientific readers :—It frequently happens that a photographer comes into possession, either by gift, purchase, or otherwise, of a positive print, which he values very highly,—would not mind taking some trouble to preserve,—but which he strongly suspects may eventually go the way of almost all photographs,—

"Come like shadows, so depart."—

or, in other words, fade completely away. The print may be the only record of a deceased friend, the negative being lost, mislaid, or broken; it may be a valuable copy of some work of art, engraving, or painting; or it may perhaps be some old familiar scene acquired by purchase, and which it would be expensive, inconvenient, or impossible, to replace. It may, moreover, have an insidious plague-spot of a yellow and ominous character in one corner, plainly foreshadowing the inevitable decay which is threatening it. What, then, is to be done with such pictures? For our own parts we make it an invariable rule always to give any print of which we have not personally superintended the washing, and which we have an interest in preserving, several good washings in warm water. This is not, however, a certain cure; sometimes it has only hastened the fading, for instance, when the print has been mounted on card by means of paste containing corrosive sublimate (as almost all bought paste does), when, as soon as hot water is poured on, the mercurial salt attacks the print and partially obliterates it at once; and at other times, the fading having already commenced, mere hydropathic treatment is insufficient to effect a cure. It would be a great boon to all photographers (and in fact to the public in general) if some of our scientific experimentalists were to investigate the matter, and publish a really effectual means of preventing this evil. Probably soaking in water containing some of Mr. Hardwich's alkaline chloride of gold toning bath, prepared with citrate of soda, as given in former numbers of the Photographic News, would prove an effectual remedy; but the exact effect, immediate as well as prospective, which this, or a similar bath would have on a washed, toned, dried and mounted photograph, should be decided beforehand by numerous experiments *in vili corpore*, it would never do to allow the first operation to be performed on a valuable picture, and then to find out that the remedy proved worse than the disease.

Amongst other uses to which glycerine is applied, is that for the solution of gum-arabic or albumen. Diluted glycerine when heated to about 110° or 120° Fah. dissolves large quantities of gum, and when heated to about 100° Fah. mixes with albumen in any proportion. Both of these solutions will keep for a long time even in summer, without change, and would probably be found of great advantage for mounting photographs on card, or as preservative agents to retain the sensitiveness of collodion plates.

FROM A PHOTOGRAPHER'S COMMON-PLACE BOOK.

We doubled the North Foreland; Herne Bay and the Reculvers were passed; so, with no more important incident than that of a hat overboard, which, as somebody (of course) said, was not lost, because we all knew where it was, Margate was reached. On the edge of the jetty, looking eagerly down amongst us for familiar features, stood a line of fair dames to welcome the "husbands' boat" (ours), and many were the exclamations heard of "There he (or she) is!" "There they are!" and "Here we are!" Almost before we were alongside, we were desperately boarded by a fiercely eager body of brawny porters, who instantly pitched, dragged, lugged, and otherwise maltreated the luggage, until the greater portion of it had been worried from the boat to the jetty, to the frantically expressed alarm of one agitated elderly lady of the male sex in particular, whose neatly and carefully canvassed, and elaborately labelled boxes had been taken ashore by mistake. Waving adieus, expressing the grief of parting in comic stage pantomime, proffering and requesting locks of hair, &c., we were once again in motion, most ungallantly and wickedly beating back the "front form company" line of ladies, as we started, by emitting a thick, black cloud of smoke from our "nasty," ungrateful chimney, which chanced to be just on a level with their sweetly-smiling countenances. Shortly afterwards, I was in the narrow streets of Ramsgate, laughing and chatting with my friends.

The following morning was brilliantly fine,—sky, sea, and landscape, radiant in the glorious sun-light; scarcely a curve breaking the glassy surface of the mighty waters, on which the white sails of the pleasure-yachts gleamed out like fallen stars. Summer seemed at length to emerge from her gloomy hiding-place with a smile the more beautiful from her tedious absence, and the quiet little town, sleeping in its nest between the chalky hills, although by no means very picturesque in itself, had a refreshing air in its demure humility, after the mighty roar, and stately pretentions, of the smoky, noisy, multitudinous metropolis. Strolling out from the town, luxuriating in the prospect of a gracefully undulating country reposing in the glad beauty of the day, I took the road leading towards Pegwell. There is some food for the camera here, thought I, entering the shade of a charming little avenue of pretty trees, and sitting me down by the road-side to contemplate its details, and fix them in my memory. But my thoughts soon wandered from lights and shades, contrasts and colours, and assumed more solemn themes, as would yours also, had you sat there with me and heard the soft, distant church bells sending their wide-spread invitation up into the vasty depths of the clear blue sky, as if to summon angels to the prayerful earth; and felt the sweet odour of flowers which, lovingly blending with the sound in the warm summer air, appeared to speak with even greater eloquence of the same majestic theme. Influenced by the serious calm of that peaceful hour I thought—

* * * * *

[These thoughts were not photographic, and as ill-natured people might say they were out of place, I refrain from transcribing them.]

On Monday morning, then, I began my photographic labours by endeavouring to secure some of the groups on the sands; but, alas! the whole affair was a lamentable failure. The light was good; my chemicals in prime order, and everything favourable for some instantaneous effects. I had a vivid impression of the Art Union production called "Life at the Sea-side," and thought to pourtray from the life some such scene; but there is no making one's-self invisible in these degenerate modern times; and so my presence with a camera sufficed to convert the most interesting of tale-inferring groups into a mere row of curious or laughing spectators, and my dark tent was evidently considered as something of the Punch and Judy order. It was a great pity, for the subject was a capital one; romping girls and boys—the former with their damp hair let out in its native luxuriance, their countenances glowing with health and merriment—were surrendering themselves up to the unrestrained joyousness of their young spirits, while feeble old folk looked on with chuckling laughter at their frolicsome games. Fond mothers watched in anxious care the movements of their half-naked little cupids, dabbling with their small, dimpled chubby limbs, and innocently gleeful faces,—in the playfully-rippling waves, just then so softly kissing their rosy, dear, little toes, that it was hard to fancy these same waves, when with the loud thunder of their angry surges they shake the strong foundations of the "firm set earth," and bury beneath their huge and topling heights the lofty vessels which now rise like mountains above their tiny leaps. There were charming groups of children, with their little spades, thoroughly in earnest with the vastly important task of rearing sand houses and castles, which an hour afterwards would be for ever destroyed. Ah me! there are others with older heads building fabrics quite as near destruction, with the same anxious care and earnestness. Then there were the bathing machines, with their picturesque proprietors and attendants; the cliffs, the pier, the negro melodists, the Punch and Judy, the itinerant lecturer, with tracts to sell, the travelling showman with a wonderful shark, clad in a picturesque sea costume (the man not the shark), with a boathook in his big brown hand, for what purpose, unless it was to hook in scarce customers, heaven only knows, etc. etc.

But the most remarkable of all objects on the sands there seemed to me to be the chairs, which they let out for a penny each. I never saw their like before. Where ever did they come from? By what effective process have they been preserved? I gazed in wonder at their mysterious and singularly varied shapes, some short and stumpy, with abbreviated, amputated, or clumsily-mended legs and backs; others tall and lanky, partaking, in a rough, home-made way, of the aristocratic Elizabethan character; some broad, as if created for "Daniel Lamberts;" some so narrow as to fit none but the thinnest of "the head's antipodes." But they were all chairs of the very oldest fashion; some were evidently crazy relics which, long ago, or "once upon a time," may have been resplendent with gilding or polish in luxurious drawing-rooms, others were sturdier veterans of less pretentious shapes, from humbler homes, associated with quaint old tables in those country farm-houses, the furniture of which seem to remain, from generation to generation, always the same; and here, clad in coats of blue or green paint, strengthened with wooden props, patches, and bars, they stood, preaching their lessons of life unheeded to the gay and noisy throng.

But I must pull up and go back again to my purpose. If you come to the Isle of Thanet with an idea—a very common one by-the bye—that picturesque scenery is only to be found amid forests of rare old trees, high hills and deep valleys, rocky eminences, wild uncultivated wastes, &c., you will most undoubtedly be disappointed. But if broad, open, undulating downs, with shady hollows here and there, beautifully variegated meadow land, and some of the most picturesque old barns, outhouses, and groups of cottages and farm-houses I ever saw, and almost danced with joy to see, will please you, here they are; and you will be ready to exclaim with me in the words of the ancient Latin rhyme of Monkton Church Tower—

"Isle of Thanet is round,
Wave and water abound,
'Tis fertile and fair,
The like is nowhere."*

Don't you imagine the long-departed monkish rhymester, surveying from his tower this fertile and beautiful country, until, in a burst of enthusiasm, he turns to the wall, and thereon chronicles the loving feelings of his heart?—I do. Although the scenery of this old island has its own peculiar charms, for the purposes of photography, it is more than usually necessary that it be carefully considered in reference to the proper combinations of light and shade, otherwise, I can easily conceive that the result will be unsatisfactory to most of its photographic transcribers. I think, with your permission, or rather without, we will just sit down awhile here, and have something to say upon the subject of chiaroscuro, with relation to landscape photography generally; but as my allotted space must be quite, or nearly, filled by now, I will postpone the remarks I have to make on this subject until next week. A. H. W.

Critical Notices.

America in the Stereoscope, a Series of One Hundred Views of the most choice and interesting Portions of American Scenery.*

We know of no application of instantaneous photography more important in its relation to the picturesque, more capable of aiding the imagination in realizing some of the most sublime and soul-stirring of nature's beauties, than is presented by some of the stereographs before us of the cataract scenery of the Western World. We gaze with varying wonder and delight, as we turn from the silvery cascades of the Kauterskill to the turbulent rapids of the Niagara, and from these to the overpowering immensity and bewildering sublimity of the gigantic cataract. To secure the slightest approximation to a truthful effect in depicting such scenes, it is imperative that the operation be, in the strictest sense of the word, instantaneous, otherwise the broken mass of falling water becomes a white patch, and the boiling, surging, seething abyss into which they fall is represented by a mass of something like wool.

In the pictures before us we have some of best instantaneous effects we have seen, and in the various views of Niagara, of which we have something like a score, their value and beauty are strikingly illustrated, conveying as they do the most vivid and impressive idea, not simply of the whirling and conflicting waters; but also of the transparent cloud of misty spray with which they are enveloped. So real is the scene, that as we turn from slide to slide, obtaining with each change fresh views and new surprises of tumultuous beauty, we seem to lose the monochome of the photograph, and behold the scene invested with all the glorious hues as well as the "thousand fantastic shapes" of nature, and stand with silent awe before the stupendous cataract.

Amongst the views of Niagara which please us most by a charm peculiarly their own, are the various winter scenes, in which snow and ice are "the ruling genii of the spot." Huge icicles hang from every available point, and the spray which bursts from the thundering avalanche of water encrusts everything with a coat of dazzling purity and whiteness, which seems to give additional sublimity to the darkling waters.

In addition to the various views of the mighty Niagara we have a large variety of cascades and cataracts of varying degrees of beauty, but less considerable in vastness and sublimity, such as the falls on the Passaic and Genessee rivers, the Trenton Falls, and some exquisitely beautiful cascades in the Catskill Mountains, in all of which a large amount of artistic skill in selection is displayed.

We have headed these remarks by a quotation from the catalogue, describing the series as "One hundred views" of choice and interesting portions of American scenery. We believe, however, that we have looked through a selection of not less than twice that number, comprising every variety of the characteristic natural scenery of the western world, together with some striking street-scenes and architectural views. Amongst the former, we may especially mention a scene in Goat Island, Niagara, called the "Lovers' Walk," —a perfect gem of landscape stereography, full of sun-light. An ice-cavern in the White Mountains presents in the stereoscope a wondrously beautiful and sparkling effect. Some of the subjects, in addition to their natural beauties, have the added charm of associations, as scenes identified with popular literature. Amongst these, is an interesting view, and excellent photograph of the "Rustic Bridge, Sleepy Hollow," the scene of Washington Irving's "Headless Man."

A slide which possesses some interest, as the verification of what has been regarded as a somewhat mythical event, is a stereograph of Blondin crossing the Niagara river on a tight rope. The feat, at the time of its accomplishment, was the subject of so much assertion and denial, that it became generally regarded as an American *canard*. We have it here, however, verified by the lens which will not lie, the adventurous Frenchman being taken *in transitu*.

An interesting circumstance, in connection with these slides, is the fact that they include the several spots of interest which his Royal Highness the Prince of Wales is now in course of visiting. A set of the stereographs of these places, together with twelve-by-ten pictures of the same places, have been purchased by his father the Prince Consort, in order that he might thus trace his son's progress.

In concluding our notice of this series, and speaking of their high merits as photographs, which, as a whole, we have not seen surpassed, we may mention the interesting fact, that they are the production of an English photographer, sent out specially by the Stereoscopic Company, for the purpose of taking them. The negatives are produced by the wet process, and possess merits as high of a photographic character, as they do in an artistic and picturesque point of view. The prints are clear, bright, and vigorous, and of the warm, purple-brown tone which is so satisfactory in landscape photography.

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* This inscription is no longer visible.

† Published by the London Stereoscopic Company, Cheapside.

The "Cometless Collodion Bottle," manufactured by Bourne and Taylor.

We have before us for notice, not a "new book," but a new bottle, which will, we believe form a valuable boon to the photographer. Few things are more trying to the patience of the operator than the discovery that an exquisite picture,—perfect in arrangement, lighting, chemical effects, and expression, is spoiled by an unlucky comet, pursuing its excentric course across the face, blinding the eye, or deforming the nose of the sitter. These meteoric-looking defects very frequently arise from some minute particle of dried collodion having dropped from the lip of the bottle, unobserved, during the process of coating the plate. The bottle before us is intended to change all this. It consists of a long bottle, like an ordinary collodion-pourer, with a cup-shaped top, out of which the collodion is *not* poured, but out of the aperture of a moveable spout, fitting into, and rising above the cup-shaped top, the whole being covered with a well-fitting cap-stopper. The moveable spout can be removed and cleaned, at any time, in a few seconds. Altogether, the arrangement is well calculated to save time, and prevent many annoying results constantly arising from the use of ordinary bottles for collodion.

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 29th August, 1860.

If any of the readers of the Photographic News are sceptical as to the *bona fide* existence of M. Disderi's *Photographic Ink*, they can solve their doubts forthwith, for the article is patented, and is now for sale. Messrs. Marion and Co. are the London agents. A litre (35¼ oz.) of the concentrated solution costs 120 francs, about three shillings an ounce; but as this concentrated solution will require to be diluted with four times its bulk of water to form a positive or a negative bath, the price is reduced to about eightpence an ounce, and at this rate it appears to be one-third cheaper than the usual nitrate of silver bath for positives, containing 20 per cent. of silver. M. Disderi claims infallible results for this substitute for nitrate of silver, and it certainly commends itself to the attention of British Photographers, endorsed as it is by so skilful and reliable a photographer as M. Disderi.

Every day fresh reports, from stations more or less remote, come in, adding to the interest already so profoundly excited by the late rare phenomenon of a total solar eclipse. It is to be hoped that some skilful hand will give to the scientific world a summary of the results obtained by the numerous host of observers, so that we may know what science has really gained by their labours. At present there appears some discrepancy concerning the conclusions arrived at respecting the *protuberances* and the *corona*. The learned Padre Secchi, in a supplement to his observations already published, announces that he has reproduced artificially the long divergent rays of the luminous aureola that surrounds the moon at the moment of totality. This very simple experiment consists in admitting into a camera obscura a large ray of solar light, a sunbeam in fact, and interposing in the path of this ray an opaque body of an irregular and indented contour, or, which produces the same result, making the aperture, by which the ray is admitted, irregular and indented in form. Divergent rays make their appearance, varying with the distance of the opaque body from the aperture, and with the position upon the axis of the sunbeam, or away from it, of the eye of the observer.

M. Gussen, an eminent Russian astronomer, conceived the happy idea of experimenting with two photographs of the moon, given to him by Mr. Warren De la Rue, with the view of determining the exact form of the lunar globe. By a series of micrometric measurements he has arrived at the following unexpected result:—By comparing certain points of the two photographic images, which were obtained under very different conditions of libration, but during the same phase of the moon, he has ascertained that the surface of this luminary which is turned towards the earth, is not a sphere, but an ellipsoid, the superior axis of which is directed towards us. This surface exceeds by nearly 7-hundredths the radius of the spherical surface. This result is the more remarkable, inasmuch as it agrees with the theoretical researches of Hansen on the shape of the moon, to nearly 0·07, for Hansen found it to be 0·034. It is to be hoped that direct measurement of the moon will confirm the curious results arrived at by the young astronomer with the photographs.

That interminable problem, "Has the moon any direct influence upon the weather?" has engaged the attention of Professor Marcet, of Geneva. He has investigated the meteorological observations contained in the *Bibliothéque Universelle de Genève* from 1800 to 1860. He first calculated the period from 1800 to 1833, then that from 1833 to 1859, afterwards the entire period from 1800 to 1860, but the results are for the most part contradictory and unsatisfactory. In comparing his results with those obtained by Schubler, Professor Marcet found that the influence of the moon upon the number of days upon which rain fell and upon the quantity of rain was *nil*. Upon the question of change in the weather the partial results are more harmonious, and the following conclusions may be deduced:—The weather generally changes at the new and at the full moon, and on the day succeeding each of these two phases, more frequently than on any other days in the lunar month. The probability of change in the weather for any given day is = 0·120 for the full moon, and 0·121; for the day succeeding these days = 0·143 and 0·148 respectively. As to the nature of these changes Professor Marcet finds that both at the *new* and at the *full* moon, the weather most frequently changes from fair to wet in the relation of 106 : 77, which gives a probability of seven changes to three.

For the changes taking place on the morrow of the full moon there are seven chances to three that the change will be for wet; while for the morrow of the new moon the chances are about equal for rain and for fair weather. The range of the barometer has generally been in harmony with the changes in the weather, and the mean of the barometer has been *true* three times out of four.

It is to be regretted that Professor Marcet has not endeavoured to verify the celebrated "Weather Rules" of Marshal Bugeaud, which appear to be the most reliable of any yet enounced.

This empirical law is given in the following terms:—Eleven times out of twelve the weather remains during the lunar month as it happens to be on the fifth day of the moon, *if* the weather continues on the sixth day as it is on the fifth; and nine times out of twelve as it is on the fourth day, *if* the fifth day resembles the fourth.

It has long since been ascertained that the moon exercises a solvent power on the clouds, and that the variations of the mean temperature are influenced by this satellite. Mr. Harrison's observations may be consulted on this head.

Photography has been called upon to lend its aid to afford ocular evidence of the influence of certain organic agents in the soil upon the growth of plants. The results are so curious and important that I shall give them in detail. It has long been a question of the greatest consequence to determine the best mode of fertilizing barren soils, more especially the immense tracts of land bordering on the shores of the ocean. M. George Ville, the experimenter in this direction, has studied the effect of adding various agents to the barren soil, and he first selected potash. The more we study vegetation the more we see that vegetables can be assimilated under many relations to the productions of inorganic nature, in this sense, that they result from a small number of material elements combining under the influence of their reciprocal affinity, apart from the changes in which life participates. Placed at this point of view, we discover the unexpected fact that the same body may be active or inert, may favour vegetation or render it no aid, according to the composition of the soil, and according as it is associated with other bodies, themselves without influence upon vegetation if employed alone.

The first proposition stated by M. George Ville contains the following striking demonstration:—A mixture of phosphate of lime and nitrogenized matter is without influence upon vegetation. The addition of potash suddenly communicates an incomparable efficacy to this mixture.

To establish this result, the operation must be conducted with porcelain biscuit crucibles, of a hard and compact texture. We must also take white sand for the soil, first calcine it in a pottery furnace, and then wash it with diluted muriatic acid, then calcine it in a covered crucible in a muffle furnace; these precautions are with the view of preventing the accidental introduction of potash. If we succeed in excluding this substance, we ascertain, 1st, that twenty grains of wheat, cultivated in a mixture of phosphate of lime, phosphate of magnesia, and nitrate of lime, in proportions equivalent to 0·110 *grammes* of nitrogen, the yield will be 6·02 *grammes* of grain. 2nd, that the addition of 3 *grammes* of silicate of potassa to the preceding mixture, increases the yield to 22·27. Thus, 6 *grammes* 2-hundredths in the one case, and 22 *grammes* 27-hundredths in the other. This is a complete demonstration, to which the photographic comparison of the plants of both series gives a striking testimony.

From an artificial soil we will now pass to a natural soil. M. George Ville has selected the *Landes*, which consist almost entirely of silicious sand, without any other addition than a little alumina, oxide of iron, and humus. He has tried with it two parallel series of cultivation, with and without the addition of potash. Each portion of soil received 10 *grammes* of phosphate of lime, and 0·110 *grammes* of nitrogen. One of the series received in addition 4 *grammes* of silicate of potash. In the results of the experiment, the two series presented a striking contrast: where the potash was deficient, the vegetation was almost *nil;* the plants, languishing and thin, could scarcely sustain themselves; where the potash was present, the vegetation exhibited a remarkable activity, the straw, in some cases, exceeded six feet in height, and the ears were well filled with grain. The weight of the produce of the first was 4 *grammes* 88-hundredths; of the second, 20 *grammes* 95-hundredths. The difference is enormous, but a view of the photographs will convey much more than any possible description. The nature of the nitrogenized matter does not affect the result of the phenomenon. M. Ville has experimented alternately with nitrate of soda, nitrate of lime, sal ammoniac, and carbonate of ammonia, &c. The result was always the same: without potash, the vegetation was meagre, rudimentary, and stationary; the presence of potash imparted to it an immediate activity.

The practical conclusion to be derived from this experiment is, that the agriculturists who attempt to fertilize the Landes and similar soils, if they wish to avoid failure, must supply the soil not only with phosphate of lime and nitrogenized matters, but also with potash.

M. Millon has for a long time pursued some very important researches upon *nitrification*. As Director of the Central Pharmacy of Algiers, he has had an opportunity of observing that the soil and streams of many localities in Algeria contain notable quantities of nitrate of potassa, and he endeavoured to determine, if possible, the true origin of the natural saltpetre obtained at several places. The necessary and sufficing conditions for nitrification appear to be, the presence of an alkaline carbonate, of a nitrogenized acid analogous to humic acid, and an ammoniacal salt, in a soil freely accessible to atmospheric air, and sufficiently moist. In such a mixture, nitrification takes place, and is complete in an interval of twenty to twenty-three days. A curious fact, observed by M. Millon, is the tendency of nitrate of potash to ascend from the depth of the soil to the surface, there to unite and form superficial layers. It is necessary to take this peculiarity into consideration in analysing soils for natural nitrates; the result will be correct only in proportion as the upper and lower portions of the soil are previously well mixed.

M. Pasteur has discovered the following curious and interesting fact. "I dissolve," says this skilful observer, "some paratartrate of ammonia, and a little phosphate of ammonia in some water; then I saw in the liquor some spores of the *pencillum glaucum*. These spores become developed, and reproduce the parent plant, the weight of which palpably increases, alimented as they are by the oxygen of the atmosphere, and the mineral and organic elements of the solution. But while the plant is growing, the solution, whose plane of polarization turned to the right, is altered, and the liquor is converted into a solution that turns the plane to the left. This experiment reminds me of one I made last year, in which the yeast from beer placed under similar conditions increased, and caused sugar to ferment. Mucedine replaced the ferment, paratartaric acid replaced the sugar. With the yeast all the sugar ferments and disappears; but the *pencillum* makes a selection. But I have previously described this singular fermentation of paratartrate of ammonia, when I saw a special yeast decompose the right acid, and avoid the left; the *pencillum*, like the ferment, prefers to nourish itself on the *right* body rather than on the *left*. Besides the views which these results suggest to vegetable physiology, and the hints they suggest upon the cause of fermentation, they offer the means of a very probable application to the decomposition of organic bodies, in which there is reason to suppose a molecular constitution of the same nature as that of paratartaric acid. Every one will be struck at seeing, on the one hand, ferments which resemble the lower vegetation, and on the other, the molecular disymmetry of natural organic products interfering in the phenomena of life as a modifier of chemical affinities.

Fluoride of calcium is found in large quantities at Gerfalco, in Tuscany. M. de Luca has recently instituted some researches on this important mineral, and upon the equivalent of fluorine.

The fluoride of calcium of Gerfalco is of perfect purity, transparent, easily cleavable; its density, at 64° F., is 3·162, by the action of heat it loses about 4 per cent., but it is not altered by hydrofluoric acid. Sulphuric acid attacks it, and disengages pure hydrofluoric acid, but its complete transformation into sulphate of lime is difficult and delicate to execute.

M. de Luca considers that the equivalent of fluorine is 19, which agrees with the results obtained by Dumas, but there is reason to think that the true equivalent, according to the law of Prout, is 18.

This is the season of "vacations," and consequently there is a great dearth of scientific intelligence. The continued rainy weather is very disastrous in its effects upon photographic interests, and should even a favourable change take place, the season must be inevitably very brief.

PRESERVING PLATES FOR A SHORT TIME.

Sir,—In reply to your correspondent at p. 203, on the above subject, I would refer him to the method adopted by Mr. Russell Sedgfield for keeping his plates moist during the long exposures which are necessary when taking interiors. After sensitising in the usual way, the plate is immersed and kept from five to ten minutes in a twelve-grain nitrate bath, which is nearly saturated with acetate of silver. The only disadvantage of this mode of proceeding is that a very long exposure is requisite, even for landscapes, ten minutes in the open air not being too much for a stereoscopic plate. The pyrogallic developing solution must be stronger than usual, say three grains to the ounce, and the collodion must be spongy, to retain as much moisture as possible.

There is no occasion, as your correspondent supposes, to prepare dry plates, if he desires to take a view within half a mile of his dark-room. That distance can be walked in ten minutes, and a wet collodion plate will keep well for that time, unless perhaps in hot weather. I have seen good negatives obtained from wet collodion plates which were not exposed until the lapse of half an hour after preparation. The shortest and best plan, however, is to have a dark or developing box, which can be easily conveyed to the spot and quickly set up. If a moist preservative be preferred, I know of none better than that of Mr. T. L. Merritt's, of Rochester. Proceed thus:—Warm any quantity of distilled or rain water, and to every ounce add three drachms of the best loaf sugar. When the sugar is melted put it on the fire till it boils, then instantly remove it, and filter the syrup before it becomes cold. Do not mix honey, oxymel, or any other substance with this, or failure will result. After sensitising your plate, dip it in a vertical bath of water, and keep it there while you coat and place another plate in the nitrate bath, then raise it up and down a few times, drain it for about a minute, and place it in a dish containing sufficient of the sugar-syrup to cover it well. Let it remain in the syrup for two or three minutes, then raise it at one end gradually to a vertical position to secure an even coating, take it out, and when it has ceased to drip, stand it on clean blotting-paper for fifteen minutes, when remove it to fresh blotting-paper, to prevent excess of moisture at the bottom edge. When it is perceived that no more will flow from the glass, place it in a plate-box, or in a dark cupboard, for future use. Plates thus prepared will keep for a fortnight before exposure, even in warm weather. They require about double the exposure for wet collodion. Before developing, put the plate in hot rain water for seven or eight minutes, to moisten and dissolve the preservative, which must then be thoroughly washed off with cold water, or stains will appear where any is left on the surface. The developer is a 2-grain pyrogallic solution, with two drops of a 30-grain nitrate of silver solution to every three drachms. When all details are well out, add more silver to bring up the desired intensity, and fix with hypo. This mode of keeping wet collodion plates moist is really a valuable one, the negatives obtainable by it being in all respects equal to those by the simple wet process, and it is so certain of giving good results, if the manipulation be properly conducted, that failure very rarely happens unless from mistimed exposure.

There is still another method which has been found to answer. Get a tin watertight plate-box, or make a wooden one watertight by coating the inside with a solution of gutta-percha in benzine. Fill it two-thirds full with distilled water, and, as soon as you take the sensitized plate from the nitrate bath, put it into the plate-box. When you have sensitized as many plates as you require, and placed them in the box, fill it up with distilled water, and close the lid. The plates will keep ten days or longer, and are to be exposed for the same time as if fresh from the nitrate-bath. Care must be taken that the plate-box is so made that the plates do not rise above the opening, but are always under water. In developing, the addition of silver is necessary.

This last method implies that the plates are to be taken from their water-bath, and placed in the dark slide, when wanted, under the protection of a portable tent or developing box. It may not, therefore, accord with the requirements of your correspondent, whose *soubriquet* reminds me of a "new developing solution for negatives," with which I have just been made acquainted, and which I communicate to you on the principle that there should be no secrets in photography.

This last grand discovery is as follows:—"To every two ounces of the usual pyrogallic developer, add two drops of chloride of gold solution used for toning (1 grain to the drachm) and two drops of silver bath-solution (30 grains to the ounce). Stir well, and then add twelve drops of pure wood naptha. Filter before use. The above will keep for ten or twelve days in good condition."

Although the effects of this developer are highly vaunted, it appears to me likely to produce too great a degree of density, and I should, therefore, think the wood naptha had better be omitted. The addition of chloride of gold is by no means a novelty, and the silver solution is superfluous. Nevertheless, I give it to your readers, in order that they may try it, and judge for themselves of its merits or demerits, as the case may be. It is just possible that it may belong to that class of recipes alluded to by your Paris correspondent, at p. 200. If so, its publication in the pages of the Photographic News may not be ill-timed. R.

P.S.—Since writing the above, in looking over the *Liverpool and Manchester Journal* for December 1st, 1858, I find a formula for a negative developing solution, prescribing four drops of wood naptha to the ounce, this addition being no doubt intended to produce a greater degree of density in the negative. The addition of chloride of gold solution was known years ago, and may be found in the journals. The formula I have transcribed is therefore not what it professes to be—a new and valuable discovery; and it will be found that the naptha and silver had best be omitted, excessive density being the least desirable quality of a really good negative.

THE GOVERNMENT COMPETITION.

Sir.—Will you permit me, through the medium of your journal, to offer a few remarks upon the above subject, in vindication of the course adopted by the Government in reference to the distribution of copies of works of art. I believe they have been actuated by a desire to do the "greatest amount of good to the greatest number;" and if any error has been committed, it has occurred in giving one or two firms a privilege all, under certain regulations, ought to have participated in. I think it is as impolitic to exclude the so politely called "pests" from our public museums and galleries of art, as it would be to deprive our literary men of the opportunity of making extracts at our public libraries; the photographic copy being to the artist relatively what the extract may be to the author, and I hope that the time is not distant when equal facilities will be afforded to both classes.

But to return, I contend that the profession will not sustain any injury from the course pursued, the taste excited in the public mind by the introduction of cheap works of art will require eventually such a supply as the Government will be unable to provide. I remember a case that will confirm this opinion, where the owner of a large and valuable collection of oil paintings, gave permission to all who wished to copy his pictures, to do so. Great was the commotion among the followers of the "black art;" and the fortunate fellow who succeeded in getting his copies first before the public, reaped a rich harvest. In this simple way a new channel was opened for the employment of skill and capital that might have remained unproductive for years.

Again, it is a well known fact that persons who require photographs from the establishment at Kensington have to wait many months before they can obtain them, and I am sure if the public generally are of the sanguine temperament of the professors of photography, their patience would be quite exhausted before the demand could be met. I think all men who are lovers of art, or devotees of science, should feel deeply indebted to the illustrious individual who first initiated the movement, and to the Government for thus becoming pioneers in the good work of carrying the humanizing influence of art into the myriad habitations of our land. It augurs well for the future, and is an unmistakeable indication of "a good time coming."

Fear not, brother Photos, millions of luminous pencils will at your command delineate objects of life and beauty to add to your already copious stores. "Fields, trees, and floods" will yet remain verdant, vegetate, blossom, and flow for your advantage, while in thousands of the homes of your poorer brethren (on one day in the week at least) you will be able in passing to peep over the blind and see pa, ma, and a little entranced group admiring some work of art suspended on the wall of the cleanly, healthful, and tastefully decorated apartment. Isn't this pretty? Fear not, it will be long ere you have occasion to join in the lugubrious strain—

"We have no work to do."

J. H. L.

Dictionary of Photography.

Potassium.—One of the metals the oxides of which are alkalis. It is of a brilliant white, slightly inclining to blue. At ordinary temperatures it is soft and may be cut with a knife; but becomes brittle and crystalline at a temperature of 32°; at a temperature of 70° it becomes semi-fluid, and fuses completely at 136°. It oxidises immediately on contact with the atmosphere, losing its brilliancy and becoming coated with a white powder, which is caustic potash. Thrown upon water it spontaneously takes fire, burning with a purple flame; its extreme affinity for oxygen causing it to combine with this element in the water. To preserve it from oxidization it is necessary to keep it under naptha, which being a hydro-carbon, possesses no oxygen. It occurs abundantly in nature, but never except in a state of combination, and generally as potassa.

Potassium, Iodide of.—See Iodide of Potassium.

Potassium, Bromide of.—See Bromide of Potassium.

Potassa, *or* Potash, is a protoxide of potassium. When the metal is heated in dry air it burns and becomes converted into a volatile, fusible substance, which is anhydrous potassa. Moistened with water it evolves great heat, and forms the hydrate.

The hydrate of potassa, or caustic potash is prepared by boiling together a dilute solution of carbonate of potassa with quick-lime in an iron or silver vessel. The carbonic acid is liberated, and forms with the lime an insoluble carbonate of lime, whilst the potassa remains in solution in the water. In the course of a short time the carbonate of lime and any excess of quick-lime settles, and the clear liquor is fit for decantation. This solution should not evervesce with acids. In order to obtain the solid caustic potash it is boiled down in the iron or silver vessel until it is deprived of all its water, except one equivalent, which remains in a state of intimate combination with the alkali. The temperature is then raised until it fuses, when it is run into cylindrical moulds, in which on cooling it consolidates. It should be preserved in stoppered bottles, as from its extreme deliquescence it rapidly becomes liquid on contact with the atmosphere. It is soluble in half its weight of cold water; is highly alkaline and caustic, acting energetically upon most organic bodies, and dissolving sulphur, alumina, silica, &c., as also the oxides of some of the metals.

Caustic potash has been recommended for use in cleaning glasses for photographic purposes. If used at all it should be highly diluted, as in a concentrated form it acts on the surface of some kinds of glass. Care should also be used to avoid contact with the fingers or the skin will suffer.

Preservative Processes.—The object of these processes is to preserve the sensitiveness of a collodion film for some time after it is excited. There are two methods of preservation in use amongst photographers—the moist and the dry processes. The former is chiefly used where a few hours, or at most a few days, are required to intervene between the preparation of the plate and its exposure or development. The earliest suggestion for this purpose emanated from Messrs. Spiller and Crookes, who recommended the application to the film, after exciting, of some deliquescent salt, or non-crystallizable substance, to preserve it from dessication, nitrate of magnesia being the agent first recommended. The use of honey was next suggested by Mr. Shadbolt, and since that period a host of similar substances, such as glycerine, golden syrup, oxymel, raspberry syrup, have been proposed, and tried with varying success. Perhaps one of the simplest and best methods of preserving plates for a few hours is by the use of golden syrup.

For the preservation of the sensitiveness of plates when thoroughly dried many processes have been proposed, the first of which was the collodio-albumen, or Taupenot's process, which is still with various modifications largely practised.

The operations in the collodio-albumen process are briefly these:—the collodion plate is coated and excited as usual, and on removal from the nitrate bath is washed with distilled water to remove the free nitrate of silver. A preparation is now made of albumen and water—the proportions of which are varied, sometimes as much as one-half of water being used—containing an alkaline iodide, or an iodide and bromide, in the proportion of two or three grains of each to the ounce of fluid. A portion of this is poured over the plate, which is then dried, and as it is in this state insensitive to light, it may be exposed to daylight. To prepare it for use it is again excited in a bath of aceto-nitrate of silver, made by adding fifty grains of nitrate of silver and one drachm of glacial acetic acid to the ounce of distilled water. The plate is again washed to remove the free nitrate of silver and then dried. It is then ready for use in the camera. The exposure is considerably longer than for wet collodion. The development is usually effected by means of gallic acid; but pyrogallic acid has occasionally been used. The plate, when ready for development is first laid for a few minutes in a dish of distilled water; a saturated solution of gallic acid containing a few drops of a twenty-grain solution of nitrate of silver is then poured over it. The development is much slower than in the ordinary wet process, sometimes occupying some hours; the plate may be rubbed from time to time with a pledget of clean cotton wool, to prevent stains from any appearance of uneven reduction. Hypo-sulphite of soda should be used for fixing in preference to cyanide of potassium.

A very important modification of this process has recently been discovered by Messrs. Petschler and Mann, and announced at a meeting of the Manchester Society. It consists in using a chloride in the albumen, omitting the final immersion in the aceto-nitrate bath, and restoring the sensitiveness of the plate by a simple wash of distilled water. The principle involved appears so startling that it will require further testing; as it at present stands it appears likely to effect an important revolution in dry processes.

One of the best dry processes is that of Dr. Hill Norris, a gentleman to whom photographers are largely indebted for his extensive researches and experiments in this direction. In his process gelatine is used as a preservative agent. The plate having been excited in the ordinary way, and washed carefully to remove the free nitrate of silver, is next coated with a solution of gelatine prepared thus:—100 grains of transparent gelatine are dissolved by the aid of heat in twenty ounces of distilled water. When quite clear two ounces of alcohol are added. When used this is to be made very hot by placing a bottle containing it in boiling water. The object of the heating is not simply to liquefy the gelatine, but to cause it to penetrate more fully and freely the pores of the collodion film; heat also facilitates the ready and even drying of the plates. The collodion film having been coated twice with this preparation, a fresh quantity being used each time, is dried either by artificial heat or spontaneously, and is ready for use. Plates thus prepared, possess, we believe, when the operations are properly conducted, a very exalted degree of sensitiveness and long-keeping properties, producing equally fine negatives and transparencies.

The development may be effected either by means of gallic or pyrogallic acid. If the latter be used the process is little different either in method or time required to that used with wet collodion. The plate should, of course, be first moistened with distilled water and a few drops of a solution of nitrate of silver added to the developer, and either hyposulphite of soda or cyanide of potassium may be used for fixing.

Proceedings of Societies.

Manchester Photographic Society.

The above Society held a meeting on the 1st instant, at the Rooms of the Literary and Philosophical Society, Manchester,—Joseph Sidebotham, Esq., in the chair.

After the election of Mr. Michael Noton as a member of the Society.

Mr. Samuel Cottam presented to the Society six stereoscopic views in Oxford, taken by himself on Dr. Hill Norris's dry collodion plates. He thought it might be interesting to the members to know that two of the plates had been in his possession about twelve months, and the results were equal to the others, which he had only recently purchased. He could not say the same of all the lot which were a year old; but that was probably owing to faults in exposure and development on his part. He was glad to bear testimony to the keeping qualities of these plates.

Mr. A. Brothers exhibited a portrait on ivory, printed without nitrate of silver, and fixed without hypo. The process was at present a secret, and would remain so for three years, to all but those who would pay £10 for the use of it.

Mr. Rogerson exhibited several very large pictures—23 by 18 inches—taken by the turpentine waxed-paper process, which were very much admired, being remarkably sharp, and full of half-tone, and force.

Mr. Hooper presented four very beautiful waxed-paper pictures to the Society's portfolio, which were also greatly admired.

The Chairman then called the attention of the meeting to some correspondence in reference to a charge of unwarrantable interference by Mr. Davies with the exhibition of photographs at the Salford Royal Museum and Library. The correspondence in which Mr. Davies denied the charge having been read by the secretary, and also the report of a committee who had been formed to consider the subject, resolutions condemning his conduct were passed, and his resignation accepted.

Mr. Mann then read the following paper on

A HITHERTO UNKNOWN PRINCIPLE IN SENSITIZING DRY PLATES.

As follows:—Mr. Petschler and myself having lately made several experiments on some modifications of the collodio-albumen process, we have now thought it desirable to lay the particulars of them before this Society; and we have great pleasure in doing so, as we believe we have some new chemical facts connected with the iodides and chlorides of silver to communicate.

The collodio-albumen process is an excellent one when the plates are used soon after preparation; but blistering of the film, and a deposit on the surface of the plates during development, are troubles known to all followers of this valuable dry process. The modification which we have the pleasure of bringing before your notice this evening has the following advantages:—The plates develop very quickly, and are remarkably clear and bright, and, most important of all, no second, or aceto-nitrate of silver bath is required. As there cannot possibly be any free nitrate of silver left, the plates, upon theory, ought to keep as long, if not longer, than any known process.

The method we have adopted is as follows:—the plates are prepared as they would be for collodio-albumen, with this exception, that instead of coating the plates with iodised albumen they are covered with albumen containing about one or two grains of chloride of sodium to the ounce; the plate is then insensitive to light, and may be, after being allowed to drain and become surface-dry, either baked in the oven or dried before a hot fire.

Now comes the peculiarity which Mr. Petschler has the credit of having discovered, and which, though apparently trivial in itself, produces a most wonderful effect: instead of dipping the plates in an aceto-nitrate of silver bath, *they are simply washed thoroughly under a stream of water*, and this renders the film *again sensitive to light*, and after being dried are ready for exposure in the camera.

I will now endeavour to explain what we suppose to be the reason of this return of sensitiveness produced by the washing, and the real change which takes place.

It appears to us to be simply that the excess of chloride in the film makes the plate insensitive to light, and the washing dissolves out all the free chloride of sodium, and leaves nothing but the pure and insoluble silver salts behind. To satisfy ourselves that this was correct, and that some ascertainable change was effected, we took a stereoscopic prepared plate, and placed it in a dish, with just sufficient water to cover the surface, and after allowing it to soak for a few minutes, and shaking the water backwards and forwards over the plate, we placed some of the water in a glass measure, and tested it with a few drops of nitrate of silver solution, when immediately a very dense milky substance formed in the water, which was chloride of silver.

To make sure there were no chlorides in the water previously we dropped some silver into it beforehand, but no perceptible milky effect was produced: this test convinced us that a very important change was effected by the washing. We have also found that the ordinary iodised albumen plates, prepared for collodio-albumen, may be rendered sensitive in the same way, namely, simply washing away the free iodide of potassium and leaving only the pure and insoluble iodide of silver behind. I will now describe a very peculiar difference in the effect of putting the plates prepared with iodised albumen and chlorided albumen in the second, or aceto-nitrate bath. A plate with iodised albumen developed better on the part which had been dipped in the second silver bath; but here is a plate prepared with chlorided albumen and you will observe the very reverse, for the part which has been plunged in the silver has developed less than the part which was left out and only simply washed. There is also this very curious distinction between the chloride and the iodide: the former develops quicker and better when not put in a second silver bath, but the latter develops slowly, and comes out faintly when not so sensitized a second time.

We do not assert the process to be perfect or better than collodio-albumen in its results, but leave the subject to your judgment and to the test of further experiments.

Numerous negatives and their resulting prints, by the process, were shown to the members, and were much admired.

The Chairman said the paper which they had just heard read was one that must not only have taken them by surprise, but must have afforded them a field for thought and for experiment of a most interesting and profitable character. They had heard a statement of facts, and seen them corroborated by results which were entirely new. The gentlemen who had pursued these experiments had most modestly declined putting forward a claim to a completed process. They stated that what they had done must be taken only as something from which more might arise, but he thought that no one could look at the negatives on the table without being persuaded that the new method was capable of producing most beautiful results, even in its present state, and that they might reasonably hope for uniformity of action. If there were no other advantage attendant upon this process over the ordinary collodio-albumen, the banishment of the aceto-nitrate bath would effect a most important improvement. The ever uncertain condition of that agent was a great evil, besides the additional expense and trouble it involved. Having been favoured with a description of this process some days since, he had prepared two plates, and produced the negatives taken upon them. One of these, before the washing, (or as it must now be called, sensitising), was placed against a window, in full sunshine, for two or three hours—a test that proved most decidedly the assertion of the discoverers, that in the first stage the prepared surface was quite insensitive to light, and that the washing in water imparted that quality. He noticed however, one remarkable fact, that the picture appeared to pass through the albumen, for it might be rubbed off without disturbing the film.

A Member asked if the albumen was not removed by the washing?

The Chairman: No. The albumen is coagulated, but perhaps not perfectly, by the heat used in drying.

Mr. Mann said the Chairman had observed that the image might be removed by rubbing without disturbing the film; he had not found it to be so on the plates that he had used, and submitted that the effect was due to a certain description of collodion.

Mr. Cottam produced two negatives taken by this process; the plates were prepared under difficulties, but it would be seen that the defects did not belong to the process.

Mr. Mabley said he had seen the progress of the experiments which had been described, and must own that he was at first sceptical as to the results, but his doubts were in a great part removed, and he thought, as all must hope, that a great improvement in the dry processes was in store. The facts, for such they were, which had been laid before them, even those in reference to the use of a chloride in the albumen, involved something perfectly new. It had been known for some time now that a plate was not destroyed in sensitiveness by the application of a chloride; but they did not know, and this gave the process one great value, that the plate was insensitive while the chloride remained upon it, but might be rendered sensitive simply by washing in water. That was a most important and novel fact, but the treatment of a plate with an iodide in a similar manner was more surprising still; and he wished particularly to call attention to the fact that *paper* treated in this manner possessed quite an opposite quality. Paper prepared for the calotype was furnished, with the exception of the collodion and albumen, with just the same film of iodide of silver, for it had first of all an excess of the potassium salt, which was removed by washing: if it obeyed the same law as these plates, it should by that washing be made sensitive, but it was well known that it might be submitted to any amount of light without injury.

Mr. Wardley said papers so prepared were improved by the action of light, and they must assume that, in the process now brought before them, the albumen played an important part; but that was a matter which must remain for further investigation. There was one feature in the process now before them which deserved particular attention: it was the facility with which plates may be sensitised upon a journey. There would be this advantage, that a sensitive surface, free from intrusive impurities, would be obtained, and those in the habit of travelling with photographic plates would appreciate this. He differed from Mr. Mann in his statement that blisters might not be expected; the film would be quite as likely to blister by treatment with water as with nitrate of silver.

Mr. Petschler said Mr. Mann's plates had been free from blisters, but he could not say that of some of his own. They had assumed, however, a different character to those upon collodio-albumen plates; they had entirely disappeared when the film was dry, and did not again rise under development.

A Member asked if Mr. Petschler would be kind enough to inform them how he was led to this discovery.

Mr. Petschler said it was in this manner:—He had for some time been experimenting with chlorides in the collodio-albumen process, and on one occasion dipped a plate into the bath of aceto-nitrate, which did not contain sufficient solution to cover it. On developing this picture he found that the portion which had not been covered with nitrate of silver developed much more quickly, and with greater intensity, than that which had been covered. This led him to consider that as the part uncovered with silver solution should have been insensitive, according to received opinions, the acquisition of sensitiveness must have arisen from the removal of the salts from the albumen by the ordinary washing which the plate was subsequently submitted to; and that proved to be the case. After that it was necessary to discover which was the better salt, the iodide or the chloride, when used as Mr. Mann had described, and the latter, after repeated experiments, was adopted. Their time, however, having been insufficient for full experiments, they did not say that the iodide might not be found equally efficient.

The Chairman said there was an advantage in developing these plates which was very striking; they did not discolour by the solution. One he purposely attempted to stain by using pyrogallic acid completely black; but it was fully as clear and bright as the other, which was carefully developed with a clear solution.

A Member asked Mr. Mann what amount of washing was required to remove the salts from the albumen?

Mr. Mann washed the plates under a tap for two or three minutes, but did not say that washing to that extent was required.

The Chairman's stereoscopic plates were merely washed in a dish containing a small quantity of water.

Mr. Mabley remarked that attention had been called to a negative, one half of which was submitted to a second sensitising, as in the Taupenot process, and the other half simply washed in water, and it was remarked that the latter was more fully developed. He submitted that this was not of necessity due to inferior sensitiveness in the former, but might arise from the fact that the albumen on the portion treated with nitrate of silver was completely coagulated, and therefore less pervious to the developing solution. He thought it would be found that both portions could be equally brought out by prolonged development, although, perhaps, not without that muddy deposit frequently got in collodio-albumen; and therein lay a great advantage of this process.

A Member asked for the particulars of exposure of one of the negatives on the table?

Mr. Petschler showed a negative, a mixed landscape, which it was agreed was fully exposed, which was taken at half-past five in the evening in a good light. The lens was seventeen inches focus, with half-inch stop; the exposure twenty minutes.

The Chairman, in proposing a vote of thanks to Messrs. Petschler and Mann, for the paper, suggested that during the next month, all those who had the opportunity should follow up this process, and that the subject should be resumed at next meeting.

A vote of thanks was then passed by acclamation to Messrs. Mann and Petschler, and also to the Chairman.

Photographic Notes and Queries.

COLOURING GLASS POSITIVES IN OIL.

Sir.—Will you be kind enough in your next to answer the undermentioned questions? 1. What is the reason a glass positive which appears bright when wet, when dry looks dull and foggy, and upon varnishing becomes again bright? 2. Is any particular varnish required for glass positives before colouring in oil? 3. Are any particular oil colours necessary? I am, yours obediently, J. J. Brown.

[1. The fault is in the collodion, in which either the pyroxyline or the solvents may be at fault. Pyroxyline made at a very high temperature, suitable for negatives, some times gives this result when used for positives. The pyroxyline being in a state of partial decomposition will produce a similar effect. The alcohol used in the manufacture of the collodion not being pure, or containing too much water, is a very frequent cause of the same evil. 2. Glass positives are rarely worth the trouble of colouring in oil; all that is necessary to prepare them for the process is a coat of a good bodied spirit varnish, which should of course be applied with heat. 3. The usual oil colours prepared for artists, and sold in tubes.—Ed.]

PRESERVING PLATES MOIST.

Bristol, *August* 29, 1860.

Sir,—The following method of keeping plates in a moist state will answer the views of your last week's correspondent satisfactorily. But my ideas are in favour of a good dry plate, carefully prepared at your leisure.

There is nothing new in the preservative itself—*glycerine;* it has been often tried before, but failed to answer the purpose, from the fact of its having a slow reducing action on silver compounds that sooner or later spoils the plate. Its action in this way can be prevented if every trace of free nitrate of silver is got rid of by decomposing it with *chloride of sodium*, and coating the plate with albumen before applying the glycerine. This is of course somewhat more trouble than a dry plate, but the object in view is the result, not the saving of trouble. My plan is to prepare the plates by the modification of Fothergill's method, I gave in No. 90 (May last) of your periodical, of course without drying: and then, after albumenising and slightly draining, coat the plate with glycerine and distilled water, equal parts, drain a few minutes and they are then ready for use.

In confirmation of the keeping properties of the plates prepared by the dry method in No. 90, above alluded to, the print from which was so favourably noticed by the then Editor, I have lately exposed several plates that have been prepared quite two months, they turned out everything that could be desired.

I know not where the blame lay, in my illegible writing, or the compositor, but I was made to talk nonsense in one or two places; for instance, instead of "the picture is not *on the surface, but in the film*," *in* was rendered *on*, a small word that made sense nonsense.—Very obediently yours,

M. Willett.

P.S.—What are the regulations of the Stereo Exchange Club?

[We will reprint in next week's issue the original regulations of the Exchange Club.—Ed.]

Sir,—Perhaps your correspondent, "Neg. Devel." in last week's News would find something to answer his purpose in the plan recommended in Vol. 1. page 130, in a letter from "One of Devon." I have seen negatives taken on these plates, and they are excellent.—Yours truly, T. E. S.

ALBUMENISING PAPER.

Sir,—In common with most other photographers I have of late met with serious loss and annoyance from the bad quality of the so-called albumenised paper; in consequence of which I determined to albumenise my own. In this I have been to some extent successful, that is to say, I have produced better results than formerly; but as difficulties still remain, and I am still short of perfection, I am induced to apply to you in hope that you, or some of your able correspondents, will help me to this desirable consummation. The first and great difficulty is the (to me) impossibility of producing an even coating of albumen while the solution is fresh. I know this ought to be done, and I believe it can. Will some experienced one kindly inform me how? My second difficulty is that of obtaining surface. I cannot get anything like the gloss observable in the commercial varieties, even with undiluted albumen. I have therefore concluded that something in the shape of gelatine or gum must be added to the albumen. Can you inform me on this point also?—Apologising for this long trespass on your space and patience, I remain, sir, yours respectfully, L. C. J.

[The addition of acetic acid for rendering the albumen more limpid, and thus giving facilities for an even coating has been recommended. The addition of ammonia to the albumen, and subsequently neutralizing with citric acid, or hydrochloric acid, forming a citrate or hydrochlorate of ammonia in the albumen might be tried. The more limpid the albumen, however, the greater the difficulty of obtaining surface, as it will have a greater tendency both to absorb into the paper and run off during draining and drying. Drying the sheets rapidly will aid in producing surface. The room in which the sheets are suspended after albumenizing should therefore be dry and warm. In many commercial varieties, other substances besides pure albumen from eggs we have reason to believe, are added. We have heard that the serum of bullock's blood is largely used. See a paragraph at the close of "Scientific Gossip," in which a method of combining gum with albumen by means of glycerine, is mentioned. We have heard many complaints of late of the difficulty of getting good albumenized paper for the alkaline gold toning toning bath. Some of our correspondents mayhave had more experience in the preparation of albumenized paper than ourselves.—Ed.]

PLATE CLEANING SOLUTION.

Sir,—In reply to "Photog. Juvenis's" enquiry for a "formula for plate cleaning solution," I have for some time used a mixture of bole Armenian and water, the proportion say, half ounce of bole to six or eight ounces of water. This will effectually clean several hundred plates, even after the film has become dry, by rubbing it with a rag to which has been applied a few drops of the above solution, a little alcohol can be added if thought fit.—Yours truly, W. H. J. G.

UNEVEN TONING.

Sir,—I request the favour of an answer to the following query. I am troubled in positive printing with unequal toning of the proof, the gold appearing to fall as a slaty blue powder, and that very unequally. I tone with Maxwell Lyte's bath of phosphate of soda and gold. I may add that my silver exciting bath is from 60 to 70 grains to the ounce. The proofs are not in the least mottled on removal from the frame. I tried the effect of carbonate of soda, thinking the toning bath might be acid, but I do not think with any improvement. The effect seems to show itself most when the prints are from weak negatives. One that I printed from a stronger negative than usual did not show much signs of this defect.—Trusting you will answer this in your next week's News, I remain, sir, yours faithfully, J. W. S.

[The print you forward suggests some imperfection in the albumenising of the paper. We have used Maxwell Lyte's process of toning, both as originally given and under various modifications, with perfect success. Try a fresh sample of paper, and take care that the prints are kept moving, and free from contact with each other. Also try using the toning bath a little more dilute; the toning will be slower, but probably more regular.—Ed.]

Talk in the Studio.

Photographic Extremes.—Album or visiting card portraits are occupying a large share of the attention of photographers in London. Portraits of cabinet ministers, their wives and little ones; of popular preachers, popular actors and actresses; of pugilists and princes, abound in every thoroughfare. It is somewhat singular that amidst this rage for miniature photographs, the premonitary symptoms of a similar run upon life sizes begin to appear; several excellent enlarged pictures, by means of Woodward's camera, having just been exhibited in the cases of different photographers.

Photography at the Palace.—Mr. Mayall has put together, in a "Royal Album," the series of royal photographic portraits made by him from time to time at Buckingham Palace. These exquisite studies from the real life are fourteen in number:—one of the Queen and Prince Consort, one of the Queen and Princess Beatrice, one of the Queen alone, one of the Prince alone, one of the Prince of Wales and Princess Alice, one of the Prince of Wales, one of Princess Alice, one of Prince Alfred, one of the Princesses Helena and Louisa, one of Princess Helena alone, one of Princess Louisa alone, one of Princes Arthur and Leopold, one of Prince Arthur alone, and one of Princess Beatrice; each study reproducing, with a homely truth, far more precious to the historian than any effort of a flattering court artist, the lineaments of the royal race. The Album reflects the highest credit on Mr. Mayall.—*Athenæum.*

The Artist Volunteer Corps.—The 38th Middlesex volunteer rifle corps is formed principally of artists (painters, sculptors, engravers, architects, musicians, literary men, actors, amateurs, and gentlemen in any was interested in, or connected with the arts), and thus has an extra claim on us for notice. Other gentlemen are also invited to join its ranks. The uniform is light grey with silver. The corps drills in Burlington-house gardens, and has the use of the ranges at Plumstead for rifle practice. The following gentlemen at present hold commissions in the corps:—W. H. Phillips, captain; A. J. Lewis, and J.E. Eillais, A.R.A., lieutenants; F. Leighton, and A. Nicholson, ensigns. The committee consists of Messrs. H. W. Phillips. John Leech, J. E. Millais, Sims Reeves, Frederick Leighton, F. P. Cockerell, Lowes Dickinson, Alfred Wigan, A. J. Lewis, Field Talfourd, Alfred Nicholson, W. Richmond, J. Thomas, Thomas Woolner, W. R. Cusins. Of architects in the ranks we find Messrs. Devey, Wyatt, Papworth, Horace Jones, Bright Smith, &c. The review in Hyde-park showed how well the corps can do their duty.—*Builder.*

To Correspondents.

Manchester Photographic Society.—We have to ask the indulgence of our readers for the omission of the report of this society, and for some other minor inaccuracies occurring in our last, owing to the inevitable confusion arising in the transfer of the mechanical arrangements of the Photographic News from one management to another.

O.P.—The best method of reducing the over intensity of a negative which has been treated with bi-chloride of mercury, is to varnish it with a strong-bodied varnish, which will render the deposit more transparent. Such varnishing is moreover necessary to protect the sensitive paper from the slightest chance of contact with the film of iodide of mercury.

J. A.—In the letter of this correspondent respecting a difficulty in the Fothergill process, for *ounces* of pyrogallic acid and citric acid, read *grains*.

Z.—Fuller's earth may be used instead of kaolin to decolorise a solution of nitrate of silver; but is not so safe as the latter, because it sometimes contains in its composition a large proportion of oxide of iron. Let us know the result on your negative bath.

Tit Tat To.—Your ivory paper-knife should not have produced any effect on the solution of chloride of gold. It is probable that some particle of hypo-sulphite of soda had come into contact with the paper-knife, which would produce the decomposition you describe, and render the solution useless for toning. Why do you not adopt the alkaline gold toning process, which is much more simple, safe, and satisfactory than that by the old toning bath you describe?

L. H. M.—Dust is one of the most common causes of the spots you mention. Filter your bath and always keep it covered. Keep your dark room, as well as your slides and cameras free from dust.

T. Gilling.—You may sometimes get a good lens in purchasing one of the cheap French ones; but it is quite a chance. To obtain a certainty you must pay for the guarantee of a good maker.

Positive.—Tone with gold only, without any hypo. With careful management you may secure almost any variety of tone you desire.

Loose Film.—Probably you are working with a very acid bath; this will give the film a tendency to leave the plate. New and contractile collodion will produce a similar result, especially if iodised with cadmium. Let the film set thoroughly before immersion in the nitrate bath. A collodion with a large proportion of alcohol will require more care in this respect than a highly ethereal one. Be careful also to clean your plate thoroughly and see that it is quite dry before coating it with collodion.

Zeta.—The stains you describe are most probably the result of touching the print in the process of printing, with fingers which had been in contact with hyposulphite of soda, the slightest traces of which would inevitably produce a stain on your sensitive paper. In printing, the most scrupulous cleanliness is imperative, in every part of the process, both in the fingers and the vessels used, without this you will waste much time and material.

W. W.—French cameras can be purchased at less cost; but English cameras are generally better made. 2. Consult our advertising columns.

T. W. W. Cook.—You will find it in the present number. See remarks above.

W. H. J. G.—You will find the fullest particulars we are at present in possession of, in the report in this number. We shall be glad to be favoured with a description of the slide to which you refer, and are obliged by your present communication. The proportions alluded to were mis-stated.

A Youthful Aspirant does not state the exact nature of his difficulties. If he will inform us of the details of the process he uses, and the results he obtains, we shall be glad to help him. He will find full and satisfactory details of the positive collodion process on page 231 of our third volume.

R.—The suggestion of our correspondent is acted on. We thank him for the reminder, and for his cordially expressed good wishes. We shall always be glad to hear from him.

A Lady Photographer.—We believe a negative may be enlarged to thrice its size, without sensible loss of definition, by means of Woodward's camera. The printing most usually and successfully adopted for use with this camera is that by development, in which case a few seconds exposure is sufficient. We hope shortly to give some fuller information on the subject.

J. H. Dallmeyer.—Next week.

Duncan MacGregor.—Negatives strengthened with bichloride of mercury and iodide of potassium, or positives turned into negatives by the same process, have frequently a tendency to reticulate and crack on drying when some kinds of collodion are used. The most frequent cause is the use of alcohol containing too much water in the manufacture of the collodion. The best remedy is the use of a better sample of collodion. The use of bichloride of mercury in the production of negatives should only be used as a last resource, as there are methods of producing the same results, which present much fewer objections.

L. J.—The alkaline gold toning bath will give you almost any tint of brown, purple brown, purple black, or blue black. The great secret of securing rich deep prints with purple black shadows and pure lights, consists in using a good albumenized paper with a full proportion of salt, excited on a strong nitrate bath, and printing and toning without delay. The formula for the alkaline gold bath has been repeatedly given. You will find Maxwell Lyte's original process at p. 301 of the 1st volume of the Photographic News. To get the blackest tones use a vigorous negative, print deeply, and tone a little further than is required in the finished print.

Amateur.—Any calculation we might make for you as to the cost of printing could be but an approximation, as so much depends on the mode adopted, and the care, skill, and economy used in manipulating. We imagine the cost of printing, toning and mounting 10×8 prints in large numbers, would be at about the rate one shilling each, and certainly not less. See articles on Fixing Positive Proofs, by Davanne and Girard in various numbers of the News during the present year. We have seen Mr. Sutton's Reflecting Stereoscope for pictures four inches square. It is more compact in form and perfect in result than the old reflecting stereoscope. The lenses are whole lenses, and are intended to be of the same focus as the lens with which the picture is taken. The result is an air of reality, and impression of the true size and distance of objects, altogether surpassing the diminished and model-like effects usually seen in the stereoscope.

W. J. D.—The defects in your waxed paper negatives are varied in character. That with the white patches in the sky appears to have been insufficiently permeated by the exciting solution, in which it must have remained too short a time. The white spots appear to have arisen from air bubbles in exciting. The stains in the other two have evidently arisen from contact with some foreign matter, which is very apparent at the back of the pictures, and may be removed by moisture and rubbing. The paper appears to be of good quality; but we fear there has been some carelessness in manipulation. Clean fingers, clean blotting-paper, and in fact, the strictest cleanliness throughout is imperative in the waxed-paper process.

Several Correspondents are thanked for congratulations and good wishes. We hope in all cases to justify their good opinion. Several arrangements are in progress, which we trust will prove of interest and advantage to our readers.

Indexes.—In our answer to T. E. R. last week respecting the numbers containing the indexes we inadvertently committed an error. The indexes to the first two volumes are as we stated in Nos. 26 and 52; but the index for the third volume will be found in No. 86. In accordance with the wish of many readers that volume contained the numbers for eight months. We intend to adhere to that system; so that the present volume will not be complete until the end of the year.

Exchange Club.—Those of our correspondents who wish their names published in the next list will be so good as to remember that in publishing their names we assume the responsibility of implying that their productions are up to the mark in quality. It is important, therefore, that a specimen print be in all cases forwarded with the name.

All Letters, Works for Review, and other Communications for the Editor, should be addressed to the Office, 32 Paternoster Row, London.

Advertisements and Communications for the Publisher for the current number, to be addressed to the Office, 32 Paternoster Row, not later than 3 o'clock every Thursday.

THE PHOTOGRAPHIC NEWS.

Vol. IV., No. 105.—*September* 7, 1860.

ARROWROOT PAPER.

In a recent interview with M. Liesegang, editor of the German *Photographic Journal,* he handed us a specimen of paper for photographs prepared with arrowroot instead of albumen. The surface is exquisitely fine and delicate, but without any of the glaze of albumen, which in the estimation of many persons of taste, gives such an effect of vulgarity to albumenized prints. The tone of a specimen we examined was highly satisfactory. We understand from M. Liesegang that this paper has been extensively used amongst photographers in Germany for some time past.

The method of preparation is as follows:—

"Dissolve 5 grammes of chloride of sodium, 0·05 grammes of citric acid, in 120 grammes of distilled water. Filter it when necessary, and pour the solution into a perfectly clean china evaporating dish. Then add to it 4 grammes of clean arrowroot meal, and heat it over a spirit lamp till it boils, stirring it all the while with a glass rod."

The paper should be of medium thickness, and as fine in texture as possible. M. Liesegang prefers the German positive papers. To apply the solution "fasten firmly with small nails at the four corners, as many sheets of paper as you wish to prepare, to a smoothly planed board, keeping carefully uppermost the side which has a fine even surface, (called the felt side). When the arrowroot solution is cold, carefully remove the film formed upon the surface, for this would easily make the preparation uneven. With a very clean damp sponge, take up a little arrowroot and spread it over the uppermost sheet of paper in even stripes over its length and breadth. It should only be touched lightly so as not to make the paper rough. Then efface the stripes by soft touches with a second very clean sponge. Afterwards remove the paper from the board, hang it up on a line to dry, and treat the remaining sheets in the same manner.

"The quantity given in the above formula is sufficient for about 12 sheets of 18×22 inches.

"The paper prepared may be kept for a long while. The citric acid serves to make the tone of the middle tints rosy and to keep the whites clear. Succinic acid and tartaric acid should not be used, because they make the paper easily turn yellow in the gold bath."

A sixty-grain nitrate of silver bath is to be used, and the printing conducted in all respects as for albumenized paper, with the exception that the *sel d'or* toning bath is recommended. We see no reason why the alkaline gold toning bath should not be used, although M. Liesegang expresses an opinion that it is not suitable.

We hope shortly to experiment in this direction, and report the results, as from the excellent colour and surface of the sample of paper before us, in which there appears an almost entire absence of texture, we anticipate that, for portraiture especially, this paper will give the most satisfactory results.

FROM A PHOTOGRAPHER'S COMMON-PLACE BOOK.*

I think photography has most conclusively demonstrated that the mere quality of naturalness is not, *alone*, sufficient to constitute a picture. Imitation is, indeed, as I believe, a far more important element in all true art than many suppose; but it is only its foundation; only, because the beauty, utility, and real value of every building lies in the superstructure, although for its power and permanency the edifice we rear must, of course, depend upon the good qualities of the foundation. Truth must, therefore, be the first consideration, for it is our best foundation; but, having secured this, we should not lay aside our masonry and tools with some idle thought of having done enough.

Nature expresses her grandest and most poetical sentiments by the aid of light, shade, and colour: colour being beyond our reach, light and shade alone remain, and to the latter must we therefore turn our earnest attention if we desire to secure the higher scale of Nature's beauties—the poetical. Now, all beauties are alike in this, they won't be won without a due and proper courtship, and this courtship must, of course, be conducted in the approved and proper fashion. If you have not, therefore, already initiated yourself into the mysteries of art, and, consequently, do not know how to set about wooing and winning Nature's beauty for yourself, why, the sooner you do so the better for all of us, and for photography.

By-the-bye, I should have reminded you that photography is not *necessarily* a truthful foundation for art, and in nothing does it more frequently err than in the representation of light and shadow. In establishing your foundation aforesaid, therefore look to this; for it is of little good to build the grandest mansion if the foundation is to give way before it is finished.

The importance of a knowledge of chiaroscuro to a photographer cannot well be exaggerated. Many portions of a landscape which the uneducated photographer would pass slightingly by as being devoid of pictorial interest, are to the eye of an artist full of poetical and picturesque beauty; and others before which the aforesaid photographer's camera would be set up with no little alacrity and pleasure, turn out, to his surprise and disappointment, little more than a gloomy mass of shadow and half tint, devoid of brilliancy, effect, and interest. The reason being that the first class of views derived their sole or chief beauty from the happy combination of light and shade; while the second obtained their apparent value from a mere happy arrangement of interesting or beautiful objects, without due reference not only to the artistic influence of absolute light and shade, but also to the actinic influence of colour in producing pale or dark tints; for you must remember that the artist, when seeking the vitally important quality called breadth, considers his dark colours, even if they be in the full blaze of the light as "*shade,*" and light colours even when in shadow, as "*light.*" In the recently concluded articles by Charles Martel, on "Colour in its relation to Photography," that gentleman showed us the *comparative* truth of the various neutral tints given by photography as representative of colour, or rather of tone in relation to colour; and appended a very useful scale, showing us how the tones of colours were represented by the tints of the engraver, and, again, by those of the photographer, pointing out the difference existing between the same. One glance at this scale must have shown every thoughtful photographer the weighty importance of studying the pictorial branches of his art with due care and earnestness.

For instance, I, as a first-rate photographic chemist say, manufacture you a collodion quite unequalled for producing clean, uniform, and brilliant effects, wonderfully sensitive, and so on; but, supposing the scale of tones or half-tints in the pictures you produce therewith be false to those of nature—what is the result? Why, form being dependent for its truthful representation upon the proper gradation, proportions, or relative degrees of intensity in the light and shade, is undoubtedly misrepresented, and your picture cannot be fairly said to represent nature save in a very mean and inartistic degree. How often do we see photographs which, in the space of a few inches, give a wonderful amount of falsehood, combined with perhaps other qualities due to skilfully applied chemical knowledge, while at the same time we hear the inartistic photographer loud in their praise, although every educated observer at once detects the utter absurdity of their pretensions. What is worse even than all this, not a few of the latter condemn our art for the faults which are due only to the limited capacity of certain of its professors.

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* Continued from p. 208.

Not long since I read, in a contemporary, how the highest praise was awarded (*at a meeting of a Photographic Society too*) for a photographic landscape which was so thoroughly untrue to nature as to represent objects "not less than five miles distant as distinctly as objects in the foreground." Ask a rifleman, who is educated to judge distance by the varying appearances of receding objects, what is his opinion of such a statement. Again, not only is artistic knowledge important in relation to the chemistry of photography, but, as the above facts demonstrate, it is no less important to the optical; for lenses may represent or misrepresent nature according to the power given them by the optician. To see nature with an eye educated to observe, or in other words with "an artist's eye," is therefore one of the first requisites of the photographer; and one of the most important studies in connection with every art-student's practice is, as before said, that of chiaroscuro, or light and shade.

George Barnard, in his excellent work on "The Theory and Practice of Landscape Painting," says, "Now, as in art, we make but a selection from nature according to the degree of taste and ability possessed by the artist, it is of the highest importance that he should attain the power of examining natural scenes, with a view of representing those lights and shades calculated to express the sentiment he wishes to convey; and as in his previous attempts in the choice of arrangement of lines and forms,* he has doubtless found the advantage of adopting some well-digested system of study, embracing the experience of ages, so, in the further prosecution of his labours, will he find that a like system tending to direct him in a judicious selection of the lights and shades of nature, will greatly facilitate the acquisition of a just knowledge of pictorial effect." If, then, the selection of the painter is admitted to be so dependent for its highest value upon a knowledge of chiaroscuro, how much more so is the selection of the photographer, who, unaided by colour and the power of alteration here, or omission there, must rely solely and entirely upon effects existing in in the natural view, over which he has comparatively no control?

Let me persuade you, therefore, my dear photographer and reader, to set to work and master thoroughly the principles of chiaroscuro, for, believe me, when you have done so, your productions will prove as superior when contrasted with your earlier specimens, aye, as an artistic painting is to the commonest woodcut. If you already know all about the matter, why, of course I am addressing that other dear photographer and reader who does not.

It is not enough, however, for the photographer to understand the rules of art for the government of his selection from nature; if light in its relation to chemistry be not also understood, an error in the exposure is likely to destroy all his carefully-studied effects of light and shade; if the picture be under or over developed, the same risk is run; and even in the printing, all the beauty of chiaroscuro in the negative may be rendered nearly valueless by unskilful treatment. Thus in every branch of the art, and at every step of its progress, we meet with the necessity of proper art knowledge.

Apart, therefore, from the experience acquired by practice to be a good photographic artist in the highest sense of the title, and secure the real chiaroscuro and truth of nature, you need, first and foremost, a good knowledge of "the few and simple rules of art," as Sir J. Reynolds calls them secondly, lenses, which give not only a sharp image free from distortion, but a *truthful* image; thirdly, a collodion, which secures "plenty of half-tint," without loss of vigour in the lights and shadows; and that experience of various lights which will enable you to expose your sensitive plate with great nicety in regard to time.

All this may seem very trite to you, and yet, perhaps, you may be one of the sage critics who so admired the "artistic" qualities of a picture, ignoring aerial perspective altogether, and giving such a view of nature as nothing but a telescope could develope to the human eye.

This is not the place to add more upon the subject; I only hoped to give a few hints intended to show that it is requisite you should so educate your eye in studiously observing, as not only to detect the pictorial and beautiful in the vast and changeful realm of nature, but also to detect the errors and falsities into which you are likely to be led even by seemingly good qualities in your lenses, chemicals, and mode of manipulation, some of which qualities are in such general high repute with photographers as to blind them to the higher and nobler virtues of their infant art. That "sharpness" which destroys the effect of atmosphere, cannot be good—that "brilliancy" and "vigour" which ruins softness, detail, and roundness, is vulgar and inartistic; and that knowledge of art which points out such glaring errors, may, if duly cultivated, yet bring about a new phase in the history of photography.

Fain would I linger upon this subject, and as fain am I to turn to others of a kindred nature; but no, sternly *no*. So up and on once more, my dear reader, for we must return to Ramsgate.

After my failure on the sands, I made my way back into the town, emerged from the narrow streets, and the crowd of dames, with their hair down and their hats on, walking with their beaus in buff slippers, and took the road past the market-place, leading to Pegwell—region renowned for shrimps and potted paste. On the right-hand side of this road I soon came upon a cluster of trees (scarce things in this island unfortunately), which surrounded a nice shady pond, and would, as I thought, photograph very charmingly. So I set up my dark tent at once and proceeded to put my camera on its stand and run about with it, now popping it down here, now there, looking on the ground glass, focussing, and fidgeting about at every pause, until at last I got the view I wanted; but I was not in a hurry when I got it, for I then set to work calculating from the effect on the ground glass what the effect would be in my production, and the result was that I was again seen running to and fro with the camera stand. [It's warm work this, when the sun is out.] By the time I had settled, like a perspiring butterfly upon the flower of a view from which I desired to extract photographic sweetness, my tent, by this time afar off, was an object of dreamy curiosity to a meditative donkey bearing a side-saddle; but Sir Ass luckily moved abruptly on in obedience to the voice of its juvenile driver. The success of the day, however, came soon after. I reached the little old village of Pegwell, so picturesquely overhanging the bay, and seated in a bower "o'erlooking the sea," partook of some shrimps, some brown bread and tea at the Belle Vue Tavern—alias Hotel. Resolved to expose one more plate before returning, I pursued the path by the edge of the cliff for some little distance and then, turning round to look at the village again, saw at a glance that from the spot upon which I then stood a sweetly picturesque view could be secured. The aspect of the little groups of irregular houses forming the village, perched upon the loftier edge of the sloping cliff, the road winding through the village into the shade of an avenue of trees beyond, the thick foliage which formed a background to the houses, the patches of verdure, and wonderful diversity of hues belonging to the rugged old cliff's descending sides,

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† See Lake Price's recent Papers on "Composition."

the row of rotten timbers at its base, the wet sands reflecting the clouds above, the sea beyond, with a distant boat breaking the straight line of the horizon, and by way of foreground the weeds and grasses which, rankly luxuriant, stood up in strong relief from uneven mounds of earth upon the edge of that portion of the cliff between my camera and the view. There being a hollow between me and Pegwell, my camera, the lens being one commanding a larger angle of view than usual, gave me the whole scene as described. A better operator would have made a better picture with the same material, but I was highly delighted with my negative, and went home, that is to say to the Camden Arms in Camden Square, rejoicing. (Good-bye until next week.) A. H. W.

SCIENTIFIC GOSSIP.

So much nonsense has been written on the subject of the stereoscope, and the physiology of stereoscopic vision, that it is quite a relief to turn to some observations on these subjects by so excellent a physiologist as Dr. Wharton Jones, professor of ophthalmic medicine in University College. They are intended to be introductory to a description of some "stereoscopic glasses for single pictures," and although we cannot quite agree with all that is stated of these glasses, the part which relates to stereoscopic vision is so clear that we are induced to briefly review them for the benefit of our readers. The introductory remarks respecting the history of the stereoscope, are of necessity brief, and give Professor Wheatstone full credit for the discovery as far as Sir David Brewster is concerned. But as if to show that it was impossible for even the best informed person to touch upon this subject without falling into error, Mr. Elliot's name is introduced as being a rival claimant with Professor Wheatstone for the honour of the discovery. The history of this claim is a rather remarkable one, and ought to be a warning to any one who is not quite certain of a statement, to pause before he commits it to print. In the *Philosophical Magazine* for April 1852, appeared a paper by Professor Wheatstone, in which the theory and construction of the stereoscope was fully described. A foot-note to this paper however stated that it was a reprint from the *Philosophical Transactions* for 1838. A Mr. Elliot, not having noticed this foot-note, thereupon published a letter, stating that Professor Wheatstone's discovery was not new, he having found out the same thing some years before, (*i.e.* before 1852). The foot-note to the paper was then pointed out to Mr. Elliot, showing that the original publication of the paper by Professor Wheatstone dated as far back as 1838. Whereupon Mr. Elliot at once wrote to renounce all claim to the discovery, stating that he had not noticed the prior date, and giving Professor Wheatstone full credit for the invention, as well as for the priority of publication. Mr. Elliot undoubtedly acted rather hastily in the first instance, but he immediately made all the amends in his power, and as the correspondence was all contained in successive numbers of the *Philosophical Magazine*, we should have imagined that the matter might have been allowed to end here. Other persons, however, besides Mr. Elliot, form an opinion upon only reading a part of the evidence. Many who ought to know more of the real merits of the case place Mr. Elliot in the position of first discoverer, although they sometimes say that Professor Wheatstone discovered it independently; but in no single instance that we have yet seen is full justice done to the inventor of that wonderful instrument the stereoscope, the discovery of which is absolutely and solely due to the genius of Professor Wheatstone, who, moreover, has given in his original paper, the best, if not the only, account of the theoretical and physiological laws upon which it is based.

All that can be perceived of solidity or depth by means of one eye may be represented by painting on a flat surface, in this case a *semblance* of solidity is seen, and this is all that a picture can represent. When, however, we look upon a natural scene with the two eyes whilst their axes are in a state of convergence, the solidity or depth is perceived as really as it may be felt by the fingers. This perception of solidity is owing to the position of the two eyes in the head at some distance apart, whereby each is fitted to receive on its retina a different perspective of the object, whilst the mind, in conformity with an original inborn law of the economy, does not perceive two superposed dissimilar images, but only a single one, and that unlike either of the two perspectives in full relief, or intaglio, as the case may be, and that in the expressive words of our author "as certainly and demonstrably as we can by the touch when moulding the hand around the object." Of course it is quite impossible to obtain such relief as this by any optical means of viewing a single picture, but Professor Jones has been led by a comparison of the appearance presented by a natural landscape, and by the same scene photographed by two cameræ and viewed in the stereoscope, to devise a means whereby a *semblance* of stereoscopic effect is produced. In viewing the natural landscape with both eyes we perceive it in the distance *receding horizontally* away towards the horizon into the depth of the space before us. This is the general effect irrespective of the objects which intervene. These stand out by themselves in different degrees of relief, according to their distance; objects in the foreground boldly, like pillars, as it were; objects further back rather flat, like pilasters. But as in general the objects in the foreground are at some considerable distance from us they do not appear to the two eyes in very strong relief. The most striking effect usually taken cognizance of by the two eyes is that of the *horizontal recession* of the landscape towards the horizon, and it is this effect which it has been the endeavour of Professor Jones to imitate. The question to be solved is this: "Would it be possible to form lenses through which, when presented before both eyes, any single painting or picture might be seen with something of a real stereoscopic effect?" Exquisitely beautiful as the views in the stereoscope are, they are not such as can be seen in nature if the objects represented be at any distance, as they must be in order to be seen at all when large. Stereoscopic views from less dissimilar perspectives than are commonly taken—from perspectives more nearly like what could be naturally projected on the retinæ from real objects—though less striking for their relief or intaglio, would be much more natural, and in the end more pleasing. Thus it is possible to sacrifice some of the relief of the details in certain pictures, provided the horizontal recession is obtained, and still to retain in some degree an appearance of solidity and relief. The plan adopted by Professor Jones is to have two lenses, plain on one side and concave on the other, having however this concavity of a rather complicated and difficult curvature, so that upon holding a pair of such glasses properly adjusted before the two eyes, and viewing therewith a picture, it will appear slightly narrowed at opposite sides, and will also be thrown apparently further back. "A slightly dissimilar perspective of the picture will thus," according to our author, "be thrown on each retinæ, and the result is in accordance with the conditions for stereoscopic vision, the perception by the observer of a corresponding stereoscopic effect or appearance of relief in the picture." Here we must differ. There will not be a slightly dissimilar perspective of each picture thrown on each retina, but merely a dissimilar *perspective of the canvas or paper* upon which the picture is drawn. The effect of the glasses will be to throw the *surface* on which the picture is in relief, making it appear as if painted on the inside or the outside of a curved surface. This will be all. To some scenes this would doubtless give an appearance of reality. In a landscape, for instance in which there are no foreground objects, the horizontal recession would be rendered evident enough; but if foreground objects happened to be present, they would be quite as likely to be thrown miles back into the horizon, as to appear in relief in front of the distant objects; and a prominent object in the centre of the picture would "recede horizontally into the depth of the space before us," just as certainly as would the horizon itself. In conclusion, we cannot admit that a stereoscopic effect is produced by these glasses: neither does the author seem to lay direct claim to much of this effect, as he states: "The sole pretension of the stereoscopic glasses is to add something to the beauty of single pictures, by giving them something of a real stereoscopic effect when viewed with both eyes, instead of the mere *semblance* of such an effect which single pictures present." The title *stereoscopic glasses* is what we take exception to, as it is liable to lead persons astray who do not know that it is impossible to obtain true stereoscopic effect by any contrivance for viewing a single picture pourtrayed on a flat surface.

The subject of the detection of adulteration in the chemicals used in photography is of the greatest importance to all engaged in the practice of this art. Nothing is more frequently adulterated than nitrate of silver, and no chemical is it of more consequence to obtain pure. Irrespective of the expense of paying 4s. per ounce for adulterating materials which are not worth the tenth part of that sum per pound, the many failures and annoyances constantly occurring to some operators' baths, are in great measure due to the presence of these adulterations. Mr. B. S. Proctor has recently been investigating this subject, and has given a very simple test whereby the purity of any sample of nitrate of silver may be readily ascertained. Amongst the more obvious substances which may be employed by dishonest manufacturers for fraudulent mixing with nitrate of silver, especially if sold in the fused state, are the nitrates of potash, soda, alumina, ammonia, lead, magnesia, manganese, mercury, tin or zinc; of course a chemist could at once detect these, but as all our readers are not chemists, they will be glad to know of a simple plan whereby the presence of any of these adulterating bodies may be detected without difficulty:—Take a fragment of the salt the size of a split pea, dissolve it in two or three drachms of distilled water contained in a phial, and add pure hydrochloric acid to it till it ceases to give a further precipitate, shake the phial briskly and let the precipitate settle, which it will do most certainly if warmed, pour a few drops of the clear fluid upon a clean slip of glass, and evaporate with a gentle heat; if it leaves a palpable residue, the sample is *certainly* impure, if it leaves no residue or a scarcely visible one, the sample is *probably* pure. Now add a decided excess of ammonia to the precipitate in the phial, and if it is entirely dissolved by this addition the purity of the sample is confirmed, but any residue not soluble in the ammonia is a further indication of impurity.

Patents on photographic subjects are not very plentiful just now; a Mr. B. Matthewman has patented an invention for "converting" photographs or pictures of any description on the handles or blades of knives, scissors, and every other description of cutlery. We confess we do not know what he means by this, nor how he intends the picture to be *converted* on to the knife. Surely the patent office was instituted for better objects than it now-a-days seems the practice of inventors to convert it to. Just about the same time that the above patent was taken out, a Mr. G. Redrup, of Loughborough, provisionally registered a contrivance for obtaining *perpetual motion!* consisting of cylinders with pistons working up and down, or to and fro, as may be required, which are actuated by simple or compound levers!! The complete patent was not taken out in this instance, probably in the meantime the inventor tried his ingenious contrivance and found that it would not work. We shall probably soon hear of a patent being taken out for the combustion of Thames water, the large amount of organic matter present in that river at this season of the year would make this not so difficult a feat to accomplish as it would sometimes be.

THE POSITIVE COLLODION PROCESS.*

BY F. B. GAGE.

THE collodion for this bath is the next thing to be procured, and as there are various ways of making collodion, it is best to discuss the subject. There are various relative quantities of ether and alcohol used by different makers. It is, therefore, only found out by actual experiment which is the best quantity to use, by finding out which produces the best result. Mr. Sutton, editor of *Photographic Notes,* is in favour of using two or more parts of alcohol to one of ether. In a former number of this journal I recommended the same thing, but I have had occasion to modify my opinion as I experimented more largely. It is true that fine results can be obtained with alcoholic collodion, but there is more trouble in keeping the bath in order where it is used, as the alcohol has to be frequently evaporated from the bath.

My aim, therefore, is to use the alcohol and ether in such proportions that the bath shall not need any meddling with—such proportions as will keep the bath in such a condition that the developing will flow without crawling in the least.

This can be done without injuring the flow of the collodion or structure of the film, while the bath shall be kept in perfect balance by the ether and alcohol. At the present time I recommend the use of less alcohol than formerly, and feel confident that it will be found better in the end for all photographers. First, then, I measure out—

Ether concentrated	4 ounces.
Alcohol, 95 per cent.	4 ounces.

This proportion I have found to be the most satisfactory of any I have tried. I then weigh out and add

Iodide of zinc	40 grains.
Bromide of cadmium	30 grains.

In adding the bromide of cadmium the object is to ensure harmony. There are various opinions about the proper quantity to use. In collodion simply iodised there are no fine half-tones when used for positives, the blacks being in masses and the whites in the same way. The addition of more or less bromide will bring out the half-tones in these masses and ensure harmonious results. Mr. Sutton, in a recent number of his publication, agrees with a correspondent that about one part of bromine to four of iodine is the best proportion to use. Now, although I admire and respect his accomplishments in the photographic art, yet my experience will not allow me to settle down on any such proportions. The Editor of *Photographic Notes,* I believe, only makes occasional experiments, he is not putting out pictures to the public daily, and here I have the advantage of him in experimenting. It may be that he develops with pyrogallic acid, which requires less bromine.

It is a curious fact, that the American photographers, as a class, use more than double the proportion of bromine that the English do. The American photographers use from one-half to three-fourths as much bromine as iodine. In this formula I recommend five parts of iodine to four of bromine, which gives all the harmony I could wish.

The rule is, to increase the bromine as much as you can without destroying the sharpness, it being remembered that too much will produce this result. The addition of about 3½ grains of soluble cotton to each ounce will give a sufficient film, while one drop of a saturated solution of iodine in alcohol should be added to each ounce. The formula will then stand:—

Ether	4 ounces.
Alcohol, 95 per cent.	4 ounces.
Iodide of zinc	40 grains.
Bromide of cadmium	30 grains.
Gun-cotton	28 to 30 grains.
Saturated solution of iodine ...	8 drops.

The addition of the iodine in alcohol is to keep back the high lights and ensure a sharp picture, which this is better qualified to do than any other body now in use. It should be borne in mind that whatever cotton you use, you are not to rely on either the honesty or skill of the manufacturers. Examine it thoroughly, and if it prove in the least degree acid do not use it, as it will spoil your collodion, and soon get your bath topsy-turvy. I would advise you to make two kinds of collodion, they may be exactly alike, only the gun-cotton in one sample may be picked up fine and allowed to soak in concentrated ammonia for one hour; then take it out and wash it very thoroughly. After you have washed it, as you think, enough, commence and wash it just as much more, and then wash awhile longer after that, as there is no danger of getting it too clean.

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* Continued from p. 206.

When it is picked apart and has become thoroughly dry, it may be dissolved in the collodion. Try the two samples of collodion side by side, and see which gives the best results. Unless the cotton was originally very free from acid, I think you will find that which was submitted to the ammonia to give the best impressions. If the materials are good this collodion should keep a year, or perhaps ten years, without deterioration. Other iodides and bromides may be used, but the metallic iodides are more stable than the alkaline, such as potassium and ammonium.

If collodion made from this formula should not prove good, you may rest assured that it is not the fault of the formula, but of the materials. Do not add anything to it, but throw it away, get better materials, and try again.

The developing for this bath and collodion may be made either with nitric or acetic acid.

The formula which I use most is:—sulphate of iron, three ounces; water, one quart; acetic acid, six to eight ounces. In developing positives it is best to develop them by rule. This rule is to stand as follows:—

1st. The stronger the developing the greater the contrast.
2nd. The weaker the developing the less the contrast.

Now, any one could take the foregoing formula and make pictures with them, and produce either the most diabolical or the most desirable result. The best materials in the hands of a bungler are not certain to produce gems. There must be a nice sense of the fitness of things, a thorough knowledge of the laws of light and shade, a power to draw out the best expression of your subject, and a promptness in placing him at his ease and in the best attitude. Further than this, there should be an intimate knowledge of the capability of the chemicals which you use.

In developing positives, therefore, bear these rules in mind, and develop them, not blindly and by chance, but if the first rule shows too strong contrasts apply your rule to the developing. Reduce its strength until there is a proper harmony existing between the lights and shades. The developing, by the same rule, can be made too weak to produce good lights. That particular point where the lights and shades blend smoothly into each other, and produce a harmonious whole, must be left for each individual operator to discover. If he has discovered that point to-day he will have to institute another series of experiments to find it out to-morrow. By that time the light will have changed, and your developing must be changed also. The rule is this:—

1st. As the light increases, decrease the strength of the developing.

2nd. As the light decreases, increase the strength of the developing.

It matters not what kind of developing you use, the rule will apply just as well to one kind as another.

If very white pictures are required, with but little harmony, the nitric acid can be used in the developing.

If your customers insist on soot and whitewash pictures, use nitric instead of acetic acid in the developing. If they insist on having a chalky picture, tell them your opinion, but do not try to force a dark picture on them.

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 5th September, 1860.

M. Poitevin, whose name is so well known in connection with litho-photography and other ingenious photographic processes, has lately exhibited some specimens of carbon-printing, and of pictures obtained with coloured powders, by a very simple process. He has not yet divulged his secret, but this much he has communicated, that the pictures are obtained by a chemical reaction which he has recently discovered, by which he obtains pictures on paper and on glass vitrified and non-vitrified. This reaction is produced under the influence of light upon a preparation which, primary being neither sticky nor hygroscopic, becomes deliquescent by the sole action of light passing through an ordinary negative. The coloured powders are afterwards applied and remain attached only to those parts of the proof which have not been subjected to the action of light. It may be remarked that this process is not based upon the decomposition by light of the mixtures of bichromate of potassa and organic bodies.

A professor of toxicology, M. Malapert, of Toulouse, has recently made a very important improvement in the manufacture of paper filters. Every one who has occasion to filter liquids, well knows that an operation requiring much time and labour is often compromised when nearly completed, by the want of strength in the material employed to remove foreign matters from the last filtration; in a word the filter often breaks under the weight of the substance contained in it. To remedy this defect M. Malapert places in the centre of his filters, and in the paste of the paper, a disc of linen. This ingenious arrangement has not only the effect of increasing the strength of the fragile medium, it has also the advantage of immediately giving a very limpid liquid at the first filtration. Now every chemist knows that the best paper to be met with in commerce requires that at least two filtrations be made, especially with liquids of feeble density. There is no doubt that M. Malapert's paper filters very dense liquids more slowly, but the safety of the operation, and the certainty of arriving at a good result at once, tends greatly to balance this inconvenience. This paper has been examined by a Committee of the Society of Pharmacy, who report that the substance of the filter fulfils all the conditions necessary to the most delicate operations of chemistry; that it contains neither lime nor iron, but only traces of chlorine, and less of that than any other kind of paper.

Few of the adepts in our black art have ever thought, perhaps, that any resemblance existed between thunder and photography, yet the following incident would appear to establish a similarity of action. On the 16th ult., a thunderbolt struck a windmill at Lappion (Aisne). Six workmen, who had taken shelter in the mill from the storm, were knocked down; two persons were struck by the electric fluid, one, a girl of eighteen, was slightly bruised from head to foot. On the back of a woman, aged 44 years, the electric fluid left a perfect red image of a neighbouring tree, in which the trunk, branches, and leaves were clearly depicted. This singular tatooing has been seen and attested by the medical and municipal authorities. There are other instances recorded of this kind of action produced by the electric fluid, however extraordinary it may appear. It is explained by supposing that the electric fluid carries with it burnt oxidised particles, or at least in a finely divided state, of the object it it has struck, and in the same order in which it encountered the object. It is not difficult to understand that in passing through an object the electric fluid moulds itself in some manner upon it, takes its form, and becomes as a seal, capable in its turn of reproducing this form. Thus the electric fluid can by burning or by deposit effect what light, by means of its chemical action, produces in the phenomena of photography.

One of the saddest consequences of the singularly cold and wet summer that has distinguished the present year, is in its disastrous effects upon bees. The continuous rains washed out from the flowers all the pollen and the nectar from which the honey is obtained. Besides, during the heavy rains the bees could not venture abroad, and consequently could not collect their usual stores. Thus the insects were literally starved in their hives. Only cakes of dried wax, without a particle of honey were found in the hives, it had all been devoured by the bees, and consequently the larvæ perished for want of the food usually stored up for them. The old hives, richer in wax, still contained a little honey, but a very small quantity. Large hives, which usually yielded forty or fifty pounds of honey, have this year supplied only seven or eight. The poor famished bees, contrary to their usual habits, have invaded the orchards, and attacked the cherries and plums. In this particular they have resembled wasps, but during the last fortnight these latter entirely disappeared. They perished sooner than the bees, because their nests, intended only for one year's service, contained but a very small quantity of honey, compared with the hives where the swarms must pass the winter, and which last several years.

Chemically pure iron can only be obtained in the laboratory of the chemist, and with re-agents of absolute purity. Pure iron in a finely divided state as reduced by hydrogen is found abundantly in commerce, but without sufficient guarantee of its purity. It is frequently mixed with very fine iron filings, and sometimes it is only ordinary iron reduced to a state of very fine powder. These adulterations, however, are very easy to discover. It is sufficient to that end to treat the suspected iron with a pure diluted acid; if the iron be in itself pure, without admixture with ordinary iron, it will be completely dissolved without leaving any residue, and the solution will also be quite limpid. Especially will it be free from sulphur, as may be proved by putting a piece of paper which has imbibed acetate of lead in contact with the hydrogen gas disengaged by the action of the diluted acid on the iron.

To obtain iron chemically pure, M. de Luca prepares first a very pure oxide of iron by decomposing an acid chloride of iron by ammonia. The hydrochloric acid, which yields the chloride eliminates most of the sulphur in the form of sulphuretted hydrogen; the complete removal of the sulphuretted hydrogen is effected by boiling the acid chloride; the purified chloride is precipitated by ammonia; then by repeated washings and by heat the remaining soluble and volatile compounds are separated from the precipitated oxide of iron. If the oxide of iron which is to yield the reduced iron must be pure, the reducing agent, hydrogen, must be pure also. To obtain this, we must, 1st, admit only of tubes of caoutchouc which have been boiled for a long time in potash in the apparatus. 2nd. Disengage the gas slowly, dividing it into excessively fine bubbles, and make them pass through a porous body impregnated with pure sulphuric acid and other suitable reagents. 3rd. Force the gas through tubes containing impregnated porous matters.

It remains to preserve the iron from oxidation. It is enclosed in flasks dried in an atmosphere of hydrogen, and hermetically sealed after they have received a given quantity of reduced iron.

All the irons of commerce which have been examined contain sulphur, they also deposit silica and black matters when treated with diluted acids, and consequently are impure. Iron can be prepared in a pure state only by pharmaceutists, its preparation requiring the minutest care, industry can furnish iron only of a relative, not absolute purity. It appears that chemically pure iron may be kept an indefinite time in distilled water without exhibiting the least trace of oxidation, and retaining all its metallic lustre.

M. Charles Tissier has instituted some interesting researches on the change in volume and in density resulting from the fixing or the removal of the water of crystallization from salts. He has studied—1st. the diminution that always takes place when a solid body is dissolved in water; 2nd. the changes in volume produced by the mixture of two liquids susceptible of dissolving, one in the other, and he has established the following rules:—1st. Whenever by the mixture of two liquids denser than water, a certain quantity of water passes from a state of combination to a free state, there is a diminution of density and an increase of volume, or, in other terms, the density of the mixture is more feeble than the calculated density of the two liquids; the loss of density, and consequent increase in volume, are much more considerable in proportion as the quantity of water set at liberty is greater; 2nd. Inversely, whenever by the mixture of the two liquids the density of which is greater than that of water, a certain quantity of this liquid passes from the free state into the state of combination, there is an augmentation of density and diminution of volume. M. Tissier now proposes the following interesting question:—Does the fixing or elimination of the water of crystallization determine the same changes of density as the fixing or elimination of water more intimately combined, that is to say, the water of constitution? From experiments made upon sulphate of soda M. Tissier concludes that the fixing or elimination of the *water of crystallization* produces neither contraction nor dilatation like that which takes place with the *water of combination* or *constitution.*

I have no particular desire to add another to the already over-crowded list of new processes; but my duty as chronicler of the progress of science requires that I should communicate to you the last, namely the *arrowroot* process, which has been given to the world by Herr Liesegang, in his *Photographic Journal*, published at Elberfeld. This is announced as a new process for obtaining positive proofs on paper; the principal conditions insisted upon by the author are:—1st. To have a stout paper with a very smooth surface, upon which the picture may be formed without sinking into its substance; 2nd. To render the sensitizing-bath acid to obtain purity and brilliancy of tone in the proof; 3rd. Only to have just sufficient quantity of silver in the paper to produce a good proof; 4th. To employ only the most suitable light for printing, direct sunshine only being employed for very intense negatives; 5th. To keep all the dishes and solutions in a state of the most perfect cleanliness and purity; 6th. To sensitize and tone in the dark.

Herr Liesegang recommends arrowroot as a substitute for albumen, in the preparation of the paper. The proofs obtained on it bearing all the finish of those printed on albumen, without the gloss of the latter, which is frequently objectionable, and often disagreeable.

The atmospheric clock, an ingenious English invention is coming into use here among photographers. Some clever mechanician is making them to sell for a shilling each; certainly the 'cheapest clock in the market,' and quite as accurate and serviceable as the most costly. It never wants cleaning or repairing, and with care may be expected 'to last for ever.'

ACHROMATIC TRIPLE COMBINATIONS.

19, *Bloomsbury St. August* 29, 1860.

Sir,—If you deem the following brief description of my new "Achromatic Triple Combinations" of interest to your readers, you are quite at liberty to use it as you may think proper.

In my paper "On the Nature of Distortions," read before the London Photographic Society in June last, and also printed in your Photographic News, I pointed to my portrait lens as the one in which the principles then explained had been introduced, and that it was "free from distortions" when used for views, &c. Allow me to observe that this statement has since been abundantly verified by the numerous photographers possessing the above lens. (One among others, a high authority among professional photographers, who uses my half-plate portrait lens, for views, 10×8, writes, "As a view lens, it cannot be too highly praised.")

There is, however, one important drawback attending the use of my portrait lens when required for views above 10×8, for the large diameters of glasses involved in its construction necessarily occasions a rather high price; and moreover, since many professional as well as amateur photographers, are often desirous of taking views on large plates, when portraits are but of secondary consideration, I have been induced, in order to meet the numerously expressed wishes, to construct a lens free from distortions more especially designed for views, copying, &c., as follows:—

My new lens, as its name implies, consists of three acromatic or actinic combinations, with cemented contact surfaces, (the loss of light by reflections does therefore not exceed that of the portrait lens). The front and back combinations are both positive, and between the two, in the position of the stop, is a negative combination. The ratio of diameter of front and back combinations, is as 2 : 3, while that of the negative is ¾ of the front conbination. The ratio of aperture to focal length is as 1 : 15, which may be increased at pleasure by diaphragms provided.

The angle of picture included is 56°.

A lens constructed as above, of 17in. focal length, covers a plate 15×2, with the lines straight to the corners.

The investigations which led to the above I may describe on a future occasion, when time does not press so hard upon me; I will only now observe that the conditions, as explained in my paper, before referred to, with reference to the correction of distortions, have been strictly carried out. The negative combination is acromatic or actinic, and of such form and focal power subservient to the corrections of the excentrical pencils, and the production of flatness of field with an aperture quite as large as can be used in the orthographic.

Although the lens has been principally constructed for views, groups, &c., yet it can also be advantageously employed for portraiture simply by removing the negative combination; for each of the three combinations being actinic *per se*, the removal of one does therefore not affect the actinism of the remaining two, and hence when used for portraits, the chemical and visual *foci* coincide, and the time of exposure is but little more than in the ordinary portrait lens, but the field is not quite so flat. I have the honour to be, sir, your obedient servant, J. H. Dallmeyer.

[We have examined a print taken by one of these lenses, in which it was put to a somewhat crucial test; the subject being a copy of a map, and the dimensions larger than the lens was intended to cover. There was perfect freedom from distortion, the lines being straight and the definition perfect to the extreme corners.—Ed.]

THE ALBUMEN PROCESS.

Manchester, *4th September*, 1860.

Dear Sir,—I wish to offer one or two hints on the dry albumen process in reply to the letter of "An Amateur" in a late number of the "News."

In order to test the comparative sensitiveness of the plates, with and without an application of chloride, and also to compare the results of an iron developer, with those of gallic and pyrogallic acids, I prepared three stereo plates, say Nos. 1, 2, and 3. They were all treated exactly alike, and in the ordinary manner, except that after removal from the nitrate bath they were washed in a dish of water, and then *half immersed* in a weak solution of chloride of ammonium. After that, they were well washed under a tap, and dried as usual.

They were exposed on the 25th ultimo, one immediately after another, to the same view, two minutes to each, with Goddard's lenses of 6-inch focus, and ¼-inch stop. The sun was shining faintly at the time, 5 o'clock p.m.

The development followed shortly afterwards. No. 1 was treated with the ordinary pyrogallic developer; No. 2, with gallic acid and acetate of lead; and No. 3, with sulphate of iron and acetate of soda, Hardwich's formula, but using rather more iron.

The salted portion of every plate appeared to have received nearly treble the exposure of the other part, which in each instance was spoiled from under exposure.

And now, regarding the comparative appearance of the negatives produced by the different developers, with reference only to the chlorized half of each plate.

No. 1 is a soft negative with well-graduated half tones, but the foreground foliage is not *quite* sufficiently exposed.

No. 2 is a little over exposed.

No. 3, a very weak negative. It appears to have received the same amount of exposure as No. 1.

The obvious conclusions are—that the sensitiveness of the plates is, under all circumstances, greatly increased by an application of chloride, and that a gallic acid and lead developer requires a shorter exposure than either pyrogallic acid or iron. The latter possessing in this respect no advantage over pyrogallic acid.

I may add, that the iron has a great tendency to dirty the film, and the deposit which it causes is very difficult to be removed.

I am trying the keeping qualities of plates prepared in this way, and hope shortly to communicate results.—Yours truly, J. Archer.

Dictionary of Photography.*

Preservative Processes *continued.*—Perhaps of all preservative processes the one most generally used is that known as the Fothergill process, deriving its name from the gentleman who first made it known. Notwithstanding the innumerable modifications of this process which have been proposed and practised, in some of which all the agents originally used in the preservation have been changed, the name has continued to be given to all processes in which the original principle was involved, namely, that of pouring over the excited plate some substance which should enter the pores of the collodion, and then wash the surplus away. In the original process as prepared by Mr. Fothergill, the operations were as follows:—The plate was coated with collodion and sensitized in the usual manner; on removing it from the bath the free nitrate of silver was thoroughly washed away, and the plate then coated with a preparation of albumen and water; when this had thoroughly permeated the film the plate was again washed, removing the superfluous albumen solution. The plate was then dried and kept in the dark for exposure when desired.

The modification which has excited most attention, and about which opinions are still divided, involves the question whether it is better to wash away entirely all free nitrate from the excited collodion plate, or to give it a limited washing, effecting only the partial removal of the silver. To effect the latter purpose the use of a limited quantity of water—four drachms for stereoscopic plates—has been recommended; the alleged result being an exalted degree of sensitiveness.

The truth appears to be this; where the maximum degree of sensitiveness is required, and long keeping qualities are not important, the limited washing leaving a small portion of free nitrate in the film is desirable. Where, however, the maximum keeping qualities are required, it is important that the whole of the free nitrate be removed, as, if any trace remain, decomposition in a comparatively short time is certain. It is important, therefore, in preparing these plates that the manipulation be regulated by the purpose for which they are intended: the maximum amount o. sensitiveness and of keeping properties being difficult of attainment at the same time.

Much difference of opinion prevails as to the best kind of collodion for this process, but the most general success has been obtained by the use of an old collodion containing a bromide in addition to an iodide. It has also been found advantageous to add to the albumen solution a chloride, phosphate, or citrate, in order that the trace of nitrate of silver remaining in the film after a limited washing may be converted into a chloride, phosphate, or citrate of silver, and thus prevent decomposition.

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* Continued from p. 213.

We subjoin a brief statement of a method of applying this process which has produced very successful results. Of old iodized collodion containing one grain of a bromide in addition to four of iodide, one part; and of a newly-iodized collodion containing iodide only, one part. The glasses must be carefully cleaned and quite dry when coated. A thirty-five grain nitrate bath, with a very slightly acid reaction. The plates, when excited, must be washed in a limited quantity of distilled water. A solution is then required prepared as follows:—Of albumen from fresh eggs, one ounce; of water, three ounces; of the strongest liquor ammonia, a few drops to each ounce of the preparation, and also a few grains of citric acid. The plate is coated with this preparation, which is left on it a few minutes; it is then to be thoroughly washed in water and dried. Plates so prepared are very sensitive, and possess good keeping properties. It is unnecessary to add that these processes must all be conducted in a room from which every trace of white light is excluded, and they must be stored away where they will be kept dry and carefully excluded from the light.

Detailed descriptions of the various processes have appeared in various parts of previous volumes.

Pressure Frame.—A frame used in printing positives on paper from negatives on glass. It consists of a wooden frame a little larger than the negative, with a rabbet in which a stout piece of plate glass is placed. Upon this glass the negative is placed with its face upwards, and upon the negative the excited paper with its sensitive side downwards. A back fitting the frame lined on the inside with cloth, fine velvet, or felt, is placed upon the paper, and brought into firm contact with the paper. The frame is then turned up so as to expose the negative and the sensitive paper beneath it to the sunlight. The back should be in two pieces fitting closely together, and connected with a hinge, so that one half may be lifted without disturbing the position of the sensitive paper, and the progress of the printing examined. The back is generally divided and hinged exactly in the middle; for portrait printing an advantage would frequently be gained if the joint were two-thirds from one end, so that a larger portion of the picture during the progress of printing might be examined at one time. The back is held in its place by bars, which are caught by a hasp, the pressure being regulated either by means of screws or springs. With the latter there is less danger of cracking the negative by excessive or uneven pressure. It is a good plan in regard to the face, or any other part of the picture requiring extra sharpness, to spread a little cotton wool thinly at the back of the paper, so as to bring it into closer contact with the negative. It is desirable to have the glass of the pressure frame as free from colour as possible.

Precipitation.—A chemical process by which a body in a state of solution is separated from its solvent, rendered insoluble, and thrown down or precipitated. When any substance in solution has another body added to it capable of combining with it to form an insoluble compound, the latter falls to the bottom of the liquid with different degrees of readiness depending on its density, &c. An illustration of this mode of precipitation familiar to photographers is the method of throwing down nitrate of silver from its solution by means of common salt or chloride of sodium, in which case the chlorine, leaving the sodium and uniting with the silver, forms chloride of silver, which is insoluble in water.

Precipitation will sometimes take place from other causes than that we have named. As for instance by changing the temperature of the solvent; thus, if excessive heat be applied to a solution of chloride of gold in water, the gold will be thrown down. In many more cases, lowering the temperature of the solvent will throw down a salt by crystallization; thus bi-chloride of mercury soluble in three parts of boiling water on cooling is thrown down in long needle-like crystals, sixteen parts of cold water being necessary to dissolve the same quantity. Precipitation sometimes takes place from the addition of another fluid to the solvent; thus, iodide of potassium dissolved in water is thrown down on the addition of sufficient alcohol: and gums soluble in alcohol, and forming varnishes, are thrown down by the addition of water.

Precipitation is one of the best and most useful methods of separating bodies, and is most useful in analysis; amateur chemists should endeavour to acquire a good knowledge of the nature of precipitates, and the various methods of producing them.

Precipitate.—The substance separated from its solvent and thrown to the bottom of the vessel.

PHOTOGRAPHY AT SOUTH KENSINGTON MUSEUM.

As our readers are already aware, a Committee of the House of Commons was appointed during the recent session to enquire into the management of the South Kensington Museum. Incidental to the general enquiry the subject of photography in connection with the department of science and art was brought before the Committee. As we have already explained to our readers, the practice of photography, in connection with that department, has grown into what we are disposed to regard as an unfair and oppressive competition with professional photographers. This competition arises out of the determination of the authorities of the museum to sell to the public photographs of objects in their own and other public institutions at prices not exceeding the bare cost of production.

The Committee consisted of the following gentlemen:—

Mr. Hutt.
Mr. Blackburn.
Mr. John Locke.
Mr. Stirling.
Mr. Kinnaird.
Lord William Graham.
Sir John Shelley.
Mr. Alderman Cubitt.
Mr. Joseph Locke.
Mr. John Cole.
Mr. Hankey.
Mr. Adderley.
Mr. Beamish.
Mr. George Cavendish Bentinck.
Mr. Lowe.

We propose to lay before our readers the report of the Committee in question, so far as it relates to photography, and such extracts or abstracts of the evidence as may be necessary in order to form a correct judgment of the case.

Before doing so it may be interesting to our readers to state the general character of the photographs already on sale at the museum. According to the official catalogue these consist of:—

The Cartoons of Raffaelle at Hampton Court, the set of seven in five sizes, commencing at 8×5, and ranging up to 48×30.

Studies, thirty in number, from the same Cartoons.

Photographs from original drawings by Raffaelle, in the Museum of the Louvre, Paris, thirty-three in number.

Photographs from orginal drawings by Holbein. The originals in the Royal Collection, Windsor Castle, sixty-six in number.

Photographs of portraits of the Tudor family.

Photographs of Limoges enamels, ivory carvings, &c., in the Louvre.

Photographs of objects in crystal and other precious materials in the Louvre.

Miscellaneous photographs from specimens in the South Kensington Museum, and from objects lent for temporary exhibition by the Queen and others.

Photographs of miscellaneous objects of art, studies of trees, &c., by C. Thurston Thompson.

Objects photographed for the Trustees of the British Museum, by Roger Fenton.

The prices and conditions of sale as announced in the Official Catalogue, are as follows :—

"1. To enable the public to derive the full advantage from the negatives which have been, or may hereafter be, made, officially, for the Department, from works of art in Foreign Museums and in other collections which cannot be photographed by private agency, the Committee of Council on Education has caused an office for the sale of photographic impressions from such negatives to be established at the South Kensington Museum. Photographic negatives made by order of the Trustees of the British Museum, and for the War and other Government Offices will also be sold. The following tariff of price for "*positive*" impressions has been sanctioned by the Committee of Counil on Education :—

"FOR UNMOUNTED IMPRESSIONS.

	s.	*d.*
A single impression, the dimensions of which contain less than 40 square inches, e.g. 5 by 7 inches, or 4 by 8 inches	0	5
40 square inches and under 60	0	7½
60 " " 80	0	10
80 " " 100	1	0½

And so on, adding 2½*d.* for every 20 square inches or under, up to 500 square inches. For prices above 500 square inches, see the detailed list.

"2. The Department does not charge itself with the mounting of impressions, as the public is able to do this for itself; but the agent will afford every information on the subject of mounting.

"PHOTOGRAPHS OF OBJECTS IN THE MUSEUM OF ART.

"3. Artists, manufacturers, and the public generally, who may desire to have photographs of any special objects in the Museum of Ornamental Art, can order negatives of such objects at the rate of 3*d.* per square inch. Any size *under* 30 square inches will be charged as 30 square inches. One proof of the negative is included in the charge for the negative. The Department does not undertake to print any further impressions; but they may be ordered from Mr. Thurston Thompson, 7 Gordon Terrace, Kensington, W.

"PHOTOGRAPHS OF OBJECTS IN OTHER PUBLIC MUSEUMS, GALLERIES, &c.

"4. The above terms for negatives will apply to photographs of special objects in other Public Museums and Galleries, such as British Museum, Hampton Court Palace, &c., but the Official Photographer will charge his incidental expenses in addition, viz., 2*l.* 2*s.* per day, and travelling expenses.

"Personal applications must be made to Mr George Wallis, Agent for the sale of Official Photographs and Reproductions, at the South Kensington Museum, in the Office at the entrance to the Museum; and all letters must be addressed to the Secretary of the Science and Art Department, South Kensington, London, W.

"By Authority of the
Committee of Council on Education."

The report of the Committee referred to, proceeds as follows on the subject of photography :—

"The collections of Reproductions by Photography and Casting have been made primarily to furnish models for the use of the eighty Art-schools in connection with the Department of Science and Art: they are obtained from public collections at home and abroad. After providing for the Art-schools, it has been thought right to give the public at large the benefit of the photographs at cost price, for the promotion of general Art-education. The Science and Art Department express a desire to avoid any competition with professional photographers by limiting their sales to photographs taken from Government collections, to which, except in rare and special cases, the trade is not admitted: but it has been objected by one commercial firm, enjoying peculiar privileges of admission to collections, and by Mr. Fenton, a photographer of eminence, that even such a limited sale by the Department is an improper interference with private enterprise.

"There is an obvious distinction between copying and photographing pictures and works of art belonging to the public. Copying is attended by no very serious inconveniences, while photography almost invariably requires the removal of the object, deprives the public of the exhibition of it, exposes it in the light, to the risks of breakage, rain, &c., which can only be guarded against by great vigilance, requires a special apparatus of considerable bulk, and uses chemicals which are always unpleasant, and often dangerous. Mr. Panizzi shows that the only fire ever known at the British Museum was caused by the negligence of a photographer. Under such circumstances all the witnesses agree that a general right to photograph cannot be conceded to all like the right to copy. Mr. Fairbairn stated, that at the Manchester Art Treasures Exhibition the photographic professors were pests, and that it was found absolutely necessary to limit the privilege to one person. In order to execute photographs in public collections there must be a monopoly somewhere. If it be proposed to grant this privilege to a limited number of competent persons, as was at one time the practice at the British Museum, the difficulty arises which was felt by the trustees, of deciding who is competent. Mr. Panizzi considers it 'a very difficult thing to determine who is competent,' and the trustees were forced to say, 'We will only admit our own photographer.' For a public department to attempt to determine this question in the case of every application would lead to constant difficulties and heartburnings. Moreover, the favoured persons having the monopoly among them might league among themselves to make the public pay an unfair toll for the use of their own property. These objections would apply all the more strongly to the appointment of a single private individual or firm, as the monopoly would be all the closer. The experience obtained at the British Museum, as well as at the South Kensington Museum, has led to the conclusion that the only feasible course for public interests, is to employ one responsible public officer; and by harmonious co-operation between these two departments, one photographer is employed for both. A tariff of moderate prices is published, at which the public may obtain negatives, and print positives for themselves. Any publisher may thus produce and publish, at his own prices, any object in the British Museum or the South Kensington Museum.

"As respects 'positives' of public objects, the sale of them by the department to the public is limited to objects in public collections which it is not permitted to private enterprise to photograph, and to a price only covering the cost of production. Your Committee consider that there is no other course so free from objections or so good for the public at large as the present system of the department. The printing of photographs stands on the same footing as the printing of parliamentary papers, and the publishers might, as well as the photographers, complain of the low price at which they are sold. If the price were increased, there is no doubt that the sales would be greatly diminished, and the spread of knowledge of parliamentary proceedings arrested. The Trustees of the British Museum attempted to supply the public with photographs of objects in the British Museum, at the same time allowing their photographer the privilege of publishing, but they abandoned the system after considerable losses.

"Your Committee have investigated fully a complaint of Mr. Scott, in respect of the photographs taken by him from Raffaelle's Cartoons. Mr. Scott complains that Mr. Caldesi was obstructed by the officer of the Department of Science and Art in taking his photographs, and that he has been undersold by the Department; but Mr. Redgrave proved that Messrs. Caldesi would have been unable to have produced any satisfactory photographs unless the Department had permitted them to have the benefit of the removal of the Cartoons by their officer, and that as the sale of the Cartoons by the Department cannot yet be said to be in operation, the apprehension of being undersold is at least premature. At any rate, the public have no reason to regret that Mr. Scott's suggestion of vesting in his firm an absolute monopoly of the photographs of the Cartoons has not been complied with. The arrangement by which a private was joined to an official photographer, was almost sure to lead to disputes, and should not be repeated."

We shall proceed next week to the evidence on which this report is, or should have been based.

Photographic Notes and Queries.

BLISTERS IN ALBUMENIZED PAPER.

SIR.—I have been troubled, at intervals, ever since I commenced to use the alkaline gold toning bath, with blisters in the albumen, which rise on immersing the print in the hypo solution. Sometimes they are not larger than the size of a peppercorn, but covering the sheet very thickly; at other times they are larger, rising in patches at least half an inch in diameter. When they are small they generally disappear on drying the print; but when large they sometimes leave a mark. Can you enlighten me as to the cause, or, what is more important, how to avoid them?—Yours, sir,

J. L. SHOTTON.

[We have at times been troubled with the same evil. The only remedy we can suggest is the use of another sample of paper. In our hands it has been the *Rive* paper which has generally produced the blisters. Try a sample of the albumenized saxe paper.—ED.]

DIRTY PLATES.

August 29, 1860.

SIR,—In reply to "Photog. Juvenis," I beg to say I can fully sympathise with him in the annoyance caused by dirty plates, and more especially in my own case, from working a great deal of out-door work many miles from the operating room, where a dirty plate at once ruffles the temper, wastes the chemicals, and spoils an excellent picture. I fully agree with the late able remarks of Mr. Thomas on the subject, that all alkalies or fixed salts are most decidedly pernicious and dangerous to the nitrate bath; but can only add for the benefit of those who are troubled with dirty plates, that I am now using the solution known as "diamond polish," and, in justice to the maker, must say, now get plates as clear and clean as I can wish. I simply clean the glass with it, leave a little on until the very last polish; it easily comes off with the leather, leaving a clean and brilliant surface. I have watched very narrowly for any change in the bath, but have never found any effect or deterioration. Let "Photog. Juvenis" use nothing but patent plate, try this solution, and I feel confident his annoyance will be at an end. C. A. P.

TRANSFERRING POSITIVES TO PAPER.

32, *Berkeley Street*, *Lambeth*, *Aug.* 31, 1860.

DEAR SIR,—I have often occasion in my business to send drawings of clocks, &c., into the country. I have now and then taken a negative picture, and sent the paper positive; but should the article be sold, the negative is then of no use. I have taken a positive collodion and transferred it to leather; but a dozen or so of these are bulky, and cost too much for postage. What I wish to know is, whether there is no quick and simple way of transferring the collodion film to black paper, I have tried the paper that used to be advertised on your wrapper, but never succeeded in stripping off the film; and three or four of my friends have also failed with this paper. Perhaps some of your kind correspondents can assist me.—I am, Sir, your obedient servant, SPX.

[Our correspondent does not describe the process of transfer he has adopted, consequently we cannot suggest any reason for his failure. There is an excellent and simple process for transferring positives to black paper described at page 286 of our second volume; a solution of gutta-percha in benzole being used to aid the transfer. If the photographs are not required of a large size, the preparation of mica, sold as the "crystal medium," and advertised in another page, will answer the purpose of our correspondent admirably. Some of our correspondents may have had experience in transferring to paper.—ED.]

TONING DIFFICULTIES.

SIR,—Will you kindly inform me the reason of my prints not changing colour on immersing into the gold bath. I have been trying 2 grains of chloride of gold to 10 ounces of water, with from 40 to 60 grains of phosphate of soda. After withdrawing them from the printing frame, I wash them in two or three waters, and then place in the gold bath; they there remain the same tint precisely as when taken from the printing frame. I have allowed them to remain in from 60 seconds to 1 hour, and no change in colour whatever takes place.—I am, yours obediently,

THOMAS LEWIS.

P.S. I excite on a 60-grain bath for 5 minutes.

[It is a somewhat discouraging fact that, satisfactory as the alkaline gold-tonig bath is in principle, and successful in results as it is in many hands, there was never a period when toning difficulties were more common. Our correspondent's difficulty is one we have never met with. We have had slow toning and imperfect toning, but never an entire absence of toning. Try using warm water to make your toning bath; and if heat does not mend the matter, try a fresh sample of paper. We suspect many of the difficulties arise from bad albumenized paper, as we have ourselves met with paper which was most difficult to tone.—ED.]

MAKING COLLODION.

SIR,—I have recently met with a difficulty in the manufacture of collodion, which I shall be glad if you explain to me. I have been using equal portions of alcohol and ether, and 4 grains of pyroxyline to the ounce of solvents. I used as an iodizer 2½ grains of iodide of potassium and 1½ grain of iodide of cadmium, together with half a grain of bromide of cadmium; these were dissolved in one-fourth of the alcohol to be used. I first put the soluble cotton into a bottle, and added 5 ounces of alcohol; and having saturated the cotton thoroughly with the alcohol, proceeded to add the ether, 20 fluid ounces. I next added 5 ounces of alcohol containing the iodides, and then the remainder of the alcohol. Instead of mixing in the usual way, the whole at once turned turbid and milky. The collodion has now stood a few days, and has become gradually clear, but has deposited a white precipitate. I had used the same materials before in the same proportions, and everything then remained clear, the cotton dissolving perfectly, and no deposit of any kind following. Indeed, I was then able to use the collodion in a few hours.

Can you tell me, sir, the cause of this, and if the collodion is spoiled? I shall be glad if you or any of your correspondents can aid me in the matter. J. S. ELDON.

[The cause is simple enough. You had probably used the same materials in the same proportions before; but you had not mixed them in the same order. You here poured your iodizer containing iodide of potassium into a large excess of ether, which at once was rendered turbid by the ether throwing part of it down, that iodide being insoluble in ether. Had you first added the whole of your alcohol, and the iodizer last, this would not have occurred. The precipitate is probably a small portion of iodide of potassium, as it is difficult to redissolve that salt in collodion when once thrown down. The only evil your collodion will have suffered is the loss of a small portion of its iodide.—ED.]

MOIST PRESERVATIVE PROCESS.

SIR,—I enclose you specimens of a moist process I use, also the formula. These plates were kept one hour from preparing to developing. I have used them at two hours interval. Honey 1 ounce, water 3 ounces. Filter through cotton wool, make very slightly acid, pour over the plate sufficient to cover, allow it to flow backward and forward, throw it off, and coat again: this last portion may be used for the next plate, first coat. The exposure was 16 seconds, with a Ross lens, 6-inch focus, ¼-inch stop, on the 23rd of December, 1859. The above plates, washed before pouring the honey on, will keep good for several months. S.

[The specimens forwarded by our correspondent leave nothing to be desired.—ED.]

NEGATIVE IODIZED COLLODION.

SIR,—I will feel greatly obliged by your allowing me to have the best receipt for negative iodized collodion.—Yours truly, S. J. COX.

[Our correspondent makes a request somewhat difficult to comply with, inasmuch as it is rarely that two operators agree as to what is the best negative collodion. Here, however, is a recipe for an excellent collodion:—

Soluble cotton	10 grns.
Ether S. G. 725	1 oz.
Alcohol S. G. 820	1 oz.
Iodide of potassium	4 grns.
,, cadmium	6 grns.
Bromide ,,	1 grn.

—ED.]

Hints to Operators.

ORNAMENTING GLASS ROOM WINDOWS.—A very simple and pretty way of decorating glass, when it is desirable to shut out a portion of its light, or soften and subdue its character, will be found in the following description. The glass must be thoroughly cleaned and freed from every sign of grease. Then mix on a slab of ground-glass, palette, or what not, a little of the tube oil colour, sold for the purposes of the artist, diluted slightly with a little pale drying oil. Lay this thinly over the glass with a large, soft brush, and then taking a large hog-hair tool, the hairs of which are of a perfectly uniform length, hold it perpendicularly to the glass, and commence dabing the ends of the hairs, gently, and with an equal amount of pressure over the whole surface, until a uniform degree of opacity is secured, and the glass has all the appearance of being ground. Now, if you desire to give this a very decorative character, closely resembling that of what is termed embossed glass, you may do so with much ease. Draw out first, on a piece of paper the required size, some pattern of an elegant character, a design for which may easily be discovered in any work on ornamental art, making the lines sufficiently strong to be seen through the semi-opaque glass; and then, with wooden points of various degrees of thickness, some finely pointed, and others wider and flat (like the edge of a chisel) trace out on the painted surface of the glass the drawing laid under it. The points will remove the wet paint. A piece of wash-leather is sometimes fastened to the ends of the sticks for the better clearing off of the paint, but in this case you must carefully prevent the leather becoming charged with paint, by repeatedly cleansing or changing it. The pattern being clearly defined and perfectly transparent, the glass is then put aside to dry, and fixed in its place the painted side inwards. To clean it use simply a little pure warm water *without soap*.

Dead Background for Glass Positives.—Some of our readers are anxious at times to produce the dead backgrounds on glass positives, the method of effecting which is regarded as a great secret, and the recipe sold at high prices. A correspondent has kindly forwarded us the following instructions. In giving them we feel it necessary to premise that in all cases we have seen these backgrounds, we have regarded them as inartistic and wrong in principle; and they are, we believe, apt to crack and peel off:—

Ultramarino	24 grains
Loaf sugar	7 ,,
Gum arabic	6 or 7 drops
Ox gall	4 or 5 ,,

These ingredients should be mixed together on a piece of plate-glass about 12 inches square, ground on the side you intend to work. Having put your colours, &c. on the glass, you must get something to grind them with. I think one of the best things you could get is one of the gold shells after you have used all the gold; fill the hollow of the shell with resin, put it somewhere to warm, and then get a cork and put it in the resin, press it in, and put it somewhere to cool; when cool, take the shell and cork, and rub the shell on a smooth flag, till the bottom of the shell be perfectly even; when you have done this you may grind away at your colour, &c. on the glass till they be thoroughly mixed and become very fine. After you have done this get a sable brush of moderate size, take up some of the colour from the glass, and go round the edge of the portrait on one side, and then work from the portrait to the edge of the glass, and then do the other side the same. You must now leave your picture to dry, which it will do in about a minute; when dry, take a dry sable brush and go over the ground with dry powder colour of the tint you wish the ground to be. If you wish a very fine ground you must grind your dry colours with a little Canada balsam and turpentine, and with this work over your back ground instead of the plain colours, but be sure not to let it touch the head or dress of the sitter or you will spoil your picture.

Removing Silver Stains from the Fingers.—A correspondent recommends as the simplest method of effecting this purpose, the use first of iodine, then of hyposulphite of soda, and finally a little dilute sulphuric acid. This answers the purpose perfectly and rapidly.

Copper as a Developer.—An American operator calls attention to the use of sulphate of copper as a developer, stating that when mixed with the photosulphate of iron in equal proportions, the development is more energetic, and can be carried further without fogging, than the iron alone. It gives, moreover, he states, a finer and more delicate appearance to the picture, having purer whites and richer blacks.

Pinholes in Negatives.—This troublesome and sometimes puzzling defect is accounted for by Mr. Waldock, in a communication to the American Photographic Society, as follows:—"In all baths producing pinholes I found deposited little needles, which, on being separated from the solution, proved to be iodide of silver. Such baths, on being exposed to the sunlight for several hours, would remain colourless, or, if blackening, would not, after filtration, work better than before. This proves the crystals not to be organic, for organic matter ought to be removed on exposure to light. The theory of this occurence, I think, is very simple. The silver solution, saturated with iodide of silver, is weakened by being worked, and will lose to a certain extent the power to dissolve this iodide of silver. It is then what may be called *sursaturated* with it, and the iodide of silver is ready to take the crystalline form. This crystallization will take place with difficulty in a smooth vessel like a porcelain bath, but if a collodionised plate is dipped into it, the crystals will deposit on the comparatively rough surface of collodion. When a vulcanized rubber, gutta percha, or photographic ware bath is used, the needles will have more tendency to deposit on the rough inside surface than on the plate. This may account for the evil being greater when a porcelain bath is used. I do not think the material of which the bath is made has anything to do with it. I have found the same difficulty to occur in a new bath, or in baths which had only been used a few days. The means of avoiding this evil is to keep up the strength of the bath; to remedy it, add a few ounces of distilled water, filter the precipitate out, and add to the clear liquid a quantity of silver corresponding to the quanty of water used."

Photographing on Concave Surfaces.—We would call the attention of our readers, says the editor of *Humphrey's Journal*, to a new and beautiful style of making pictures to be set in the form of brooches, ear-rings, etc.; invented by Mr. Henry Oliver, which bids fair to prove of great interest to operators generally, and create a new and largely increased demand for portraiture. The improvement consists in the production of permanent photographic or sun-pictures upon concave surfaces of glass, by causing the picture to be taken on a collodion film, or its equivalent, on the inner or concave surface of the glass, and then coated or backed with suitable cement. We have at this office some specimens of work under this new process, which are very beautiful; they can be set in gold or in any other style that may be desired. A peculiar and beautiful effect is produced by placing a photographic picture upon the concave surface; the appearance of the finest enamel painting is readily imitated. The figure shows up a relief, which is not the case when it is taken upon a flat surface. We are aware that sun-pictures have been produced upon the inner surfaces of planes of transparent materials, and that temporary concave fields have been suggested to overcome the spherical aberration of the lenses in the production of pictures having a plane surface. But what Mr. Oliver claims for his invention is photographic or sun-pictures upon concave surfaces of glass, and backing up the same with cement. [We apprehend the results are similar to Mr. Skaife's "Chromo-crystals."—Ed.]

Talk in the Studio.

Photography for Illustrated Works.—A work by Mr. Walter Thornbury, to be entitled "Turkish Life and Character," is announced as in preparation, which is to be illustrated with photographs.

The Art Season being fairly over we may congratulate ourselves upon the improved character of its career: three-fourths out of the large number of four thousand and sixty works of art exhibited having found purchasers; and the sum secured by the Royal Academy Exhibition being the largest on record—viz.: £11,000.

The Royal Academy has published a report from the council intimating its desire of augmenting the number of Academicians. There is something pleasant and hopeful in contemplating the necessity which must prompt such a step.

Robert Hunt, Esq., F. R. S., whose services in the cause of scientific photography are well known to our readers, has recently received a valuable testimonial in the shape of a costly service of plate and a purse containing 200 guineas, presented to him at the Geological Museum.

Prussian Photographs.—The firm of Messrs. Haase & Co., of Berlin, have just published a series of original photographs of the Royal Family of Prussia, and portraits of the political, military, and scientific celebrities of the kingdom. The portraits are of the same size and style as those of Her Majesty, Prince Albert, and the royal family just published in London. The Berlin photographs are excellent specimens of the art; the lights and shadows are as delicately given as in the most elaborate miniatures. To the portraits of the Prince and Princess Frederick William, and the Prince Regent, are added those of Meyerbeer, M. Stahl, and M. von Schleinitz, the Minister of Foreign Affairs. In each instance the features and expression are perfectly rendered.—*Times.*

Photographs of Prints.—A proprietor of various copyrights of engravings has found it necessary to advertise in *The Times* that he will take legal proceedings against all photographers infringing his copyrights by taking and selling photographic copies of his pictures.

Life Size Prints.—A sample of albumenized paper was handed us a few days ago by M. Liesegang, editor of the *Photographisches Archiv*, of excellent quality, which is prepared, we understand, in sheets as large as six feet by four, intended for printing by development and Woodward's camera. We learn from the same gentleman that a trial he had made of the recently discovered "photographic ink" was quite satisfactory in result.

Two Ways of Life.—The negatives of this magnificent composition photograph of Rejlander's, of which most photographers have heard if they have not seen, are injured so that further prints are now an imposibility. The few original prints remaining in existence are in the hands of the "London Stereoscopic Company."

To Correspondents.

P. C. Bath.—There is no reason why with careful manipulation your bath should become spoiled in a short time. We have used one for years without other treatment than occasionally evaporating excess of ether and alcohol, and filling up from time to time with a forty-grain solution. You may easily add too much silver. Possibly the collodion is at fault. A simple way to make a positive bath is as follows:—Dissolve one ounce of pure recrystallised nitrate of silver in fourteen ounces of distilled water: coat a plate with collodion and leave it for a few hours in the bath. If the nitrate of silver be pure, the bath will probably work well at once. If it show any signs of fogging, add two or three drops of nitric acid. A bath so made ought with proper treatment to work well for months, and should only require filling up from time to time with fresh solution a little stronger than that originally made.

G. D. S.—We do not know of any professional photographer who takes microscopic photographic portraits. If we learn, we will inform you in another number.

S. P. F.—Probably the heat applied to the crucible was not sufficient, as it is difficult to get heat enough in a common fire. Application at a blacksmith's forge is best. You have not, moreover, used the best flux: equal portions of carbonate of potash and carbonate of soda. Try the addition of these, and apply greater heat. After washing your chloride of silver well to remove all soluble matter, add twice its weight of the flux we have named, and fuse in a crucible. The deposit from your hypo bath is probably sulphide of silver, a simple method of reducing which is given on page 6 of our third volume.

H. A. J.—You may diminish the capacity of your bath by putting in a plate of thick glass, which may if you choose be cemented in by means of shellac. There is nothing detrimental in the glass you name. Gutta percha, if quite pure, is without any injurious action on the silver bath; but there is a great deal of adulterated gutta percha in the market. We have not seen the colours to which you refer; nor do we admire the dead opaque backgrounds in glass positives. You will find a recipe and instructions for producing them, however, in another column of this number. We cannot speak definitely of the lens to which you refer; but see no reason why it should not answer your purpose.

Cuprum.—See answer to "loose film" in last number; and be gentle in your final washing. An article on the positive process was commenced in the last number, which will be completed in three or four numbers.

S. G. S.—The lines you mention in the direction of dipping may proceed from two or three causes. It may proceed from a floating scum having formed at the top of your nitrate of silver solution; in which case remove it by means of a few strips of blotting paper which must be drawn along the top. From the bath having a tendency to fog; in which case a drop or two of acid will be the remedy. Sometimes the collodion is in fault; in which case, add a few drops of tincture of iodine, and if that remedy fail try another sample. The first-mentioned cause is most common.

F. M.—Protonitrate of iron is a less energetic developer than the protosulphate. It gives a picture of silvery whiteness. Wash more thoroughly before fixing with cyanide.

E. T.—Your print has the appearance of having been fixed in a very weak or very old hypo solution. The defect may also arise from using a dirty dish, or one containing some trace of nitrate of silver used to hold the washing water.

James R.—It is not imperative that the alkaline gold toning bath be used hot; but heat materially facilitates the toning action. Prolonged soaking of the print in salt and water prior to toning, makes that operation more difficult. The reddening of the print in the hypo, if it proceed to an unpleasant degree, would suggest the necessity for a longer action of the toning bath. If that does not remedy it, try another sample of paper.

Tyro.—Probably it is your camera not your lens which is at fault. We have known many lenses condemned as not having their chemical and visual focus coincident simply from the imperfect adjustment of the dark slides of the camera. Remove the lens from the camera, and placing the focussing glass in its place, measure carefully the distance from the point of the ground glass to the flange of the lens. Now remove the ground glass and replace it with the dark slide containing a glass plate, and measure the distance between the plate and the flange of the lens. The distances ought in both cases to be exactly the same, and if they are not so, the corners of the carrier in the dark slide must be adjusted to make them so.

L. S. D. Your name shall be inserted. We shall require specimens, as we know nothing of what was forwarded before our management. Your name is not very plainly written, please give it plainer in your next.

Positive.—The article you require is the "Crystal Medium" advertised in another column.

Alfred Mitchell.—Other things being equal we should prefer the length of the building to run north and south; the one outlined all in black ink in your diagram.

Stereo.—You do not state the amount of washing your plates received on coming from the exciting bath. Many operators find that if the free nitrate of silver be entirely washed away the plate becomes insensitive. The collodion you name does not, we believe, contain a bromide; add for future trials about half a grain of bromide of ammonium to each ounce of collodion. With your present batch of plates try the process of Messrs. Petschler and Mann; that is, thoroughly wash each plate in water and then try them. See some remarks on the subject in the "Dictionary of Photography" in this number.

A Youthful Aspirant.—There is no reason why, with the formula you have stated, you should fail in getting satisfactory results. We will add one or two suggestions, however. We do not recommend acetic acid in a positive bath, a few drops of nitric acid answering the purpose better. Try the addition of a few drops of nitric acid to your bath. Some excellent positive operators use as much as one drop to the ounce when using a forty grain bath. The slight discolouration of your iron-developing solution should not make much matter. Try, in addition to the material you already use, one drop of nitric acid in each ounce of developer; probably your collodion is not good. See answer above as to the preparation of a positive bath. See also article on "Positive Collodion Process" in last and present number.

C. E. L. sends us from India several prints in the most deplorable state of discolouration and fading, which were toned in the alkaline gold toning-bath, fixed in new hypo, and washed in a running stream of water. We are completely puzzled by their appearance, coupled with our correspondent's statement of the mode of producing them. They have all the appearance of imperfect fixation, and still more imperfect washing. They present a very acrid taste, and water in which one of them was soaked for awhile gives brown turbidity on testing with nitrate of silver. We will give the matter further attention; but strongly suspect that some overlooked error or accident in manipulation exists. The former letter and prints alluded to have not come to hand.

W. S.—We are not aware of any agent for M. Bertch's Automatic Camera in this country. An advertisement recently appeared in our columns announcing enlarged copies from small negatives. But as your letter arrives at the last moment we cannot refer.

W. R., D. H., Lux, Amateur and Subscriber, and some other correspondents next week.

Exchange Club.—Those of our correspondents who wish their names published in the next list will be so good as to remember that in publishing their names we assume the responsibility of implying that their productions are up to the mark in quality. It is important, therefore, that a specimen print be in all cases forwarded with the name.

All Letters, Works for Review, and other Communications for the Editor, should be addressed to the Office, 32 Paternoster Row, London.

Advertisements and Communications for the Publisher for the current number, to be addressed to the Office, 32 Paternoster Row, not later than 3 o'clock every Thursday.

THE PHOTOGRAPHIC NEWS.

Vol. IV., No. 106.—*September* 14, 1860.

THE SEARCH AFTER DRY COLLODION.

BY M. VERNIER, JUN.

The rapidity of collodion employed in the wet state has naturally led photographers to employ it dry; but the experiments which have been made with the view of attaining this aim, not being successful, a diversity of opinion was spontaneously declared amongst the adepts of photography, and everyone set himself to work to explain the cause of failure.

Then we saw a host of processes make their appearance, of which it may be truly said, that thus far they have only served to impede progress, and to render manipulation more complicated and difficult, in a word, to produce only partial and incomplete results. To what tortures, to what punishments have they not submitted poor collodion? What products entirely foreign to its nature have they not made it digest? What baths, what syrups, what washings have they not inflicted upon it? The one class (and by far the most numerous) have thought to retain the sensitiveness of the silver-iodide, by coating the film with various emollient substances, such as honey, gum, and sugar. They have covered it with gelatine, albumen, glycerine, dextrine, syrup, even beer, extract of malt, &c., but none have been successful. We can tell them why.

The others (the most intelligent, and if we rank ourselves amongst this class, do not consider us vain, for have we not suggested cereoline?) have introduced into the collodion various bodies foreign to photogenic products, such as resin, amber, chloroform, cereoline, &c., with the view of dividing the molecules of the dry collodion, and consequently rendering it more accessible to the chemical action of light, and to the developing agents, but neither have these succeeded: we can tell the reason why of these, also.

Besides, the collodion, in digesting these naturally fatty substances, submits them to the same regime, to the same inertia, as the iodized products which make part of its composition, that is, it deprives them of all liberty of action, because they unite with the collodion, which itself envelopes them in its glutinous substance. If formerly we succeeded with cereoline, we cannot now attribute it to this product, which we incorporated with the collodion, but rather to other causes and to other circumstances, which we now propose to reveal.

Nevertheless, we may believe that if, instead of fatty bodies we had introduced a mucilaginous or deliquescent substance into the collodion, such as sugar or sugar-candy, we might have obtained good results, because we should then have rendered the really vitreous film of dry collodion soft and plastic, in which state it would be more apt to receive the luminous impression, and more accessible to the final baths of the process. But still, we repeat this is not the true path that will conduct us to the definite constitution of dry collodion.

Others have thought they discovered the evil in the quantities prescribed in the formulæ: therefore they modified the collodion, modified the silver bath, modified the developing solution; but the results of all these modifications have not been satisfactory, for they have not brought the desired success, we shall show why.

Amid this general conflict of various processes and erroneous opinions, appeared M. Gaudin, who in a rational and well written article, advised us to immerse the sensitized plates in a bath of water containing a little chloride or iodide, with the view of completely removing the free nitrate on the prepared plate, which, he said, must diminish, if not destroy, the sensibility of the iodide of silver.

We have no intention of depreciating the labours of so intelligent a writer, for he has deeply studied the subject, and treats it like a master. We may even say that it was he who put us on the right track. But we do not think that an extremely minute film of nitrate of silver can obstruct the decomposing action of light, so as not to produce a picture. M. Gaudin knows very well that the presence of free nitrate of silver on dried sensitized albumen exposed makes its appearance upon development in the black spots distributed over the plate, but in no respect injures its sensibility, as the image appears upon all the points (of the plate) while the film of collodion sometimes exhibits no indication of the reduced silver, even without the appearance of the image.

But some will say—there is the Taupenot process. True, but the Taupenot process is not dry collodion; the Taupenot process is the albumen process rendered more sensitive by a layer of sub-iodide of silver. What supports my assertion is, that if we substitute gelatine for collodion, as a subjacent coating to the albumen, we obtain the same results, and just as rapidly. No; it is not in preservative agents that we must seek the remedy for these causes of failure—these coatings, we repeat, only prove a double obstacle to the actinic impression of light; nor, moreover, seek in fatty matters put to digest in the chemical coating the means of opening a larger issue to the slightly capillary structure of the collodion* it is its essence which constitutes its physical or chemical power; it is the germ of the image.

Still, we do not say that we shall not put in practice the idea emitted by M. Gaudin. If the method he has given to us, moreover, only as an hypothesis, does not attain the desired aim, it has at least the advantage of avoiding the disagreeable veil and spots on the positive proofs.

Now that we have allowed ourselves to attack indiscriminately all the known dry-collodion processes, it is but fair that we make known the causes of failure and the means of remedying them. This we propose to communicate in our next.

(*To be continued.*)

SCIENTIFIC GOSSIP.

Some very curious photographs of the late solar eclipse have recently come under our notice. They were taken by Mr. Heisch, a gentleman well known in the scientific and photographic world. The sun's disc is represented in them as about ·14 inch diameter, and the different phases of the eclipse are very beautifully and sharply defined. They are five in number, and were taken at Greenwich, at the respective times of 2h. 3′ 37″, 2h. 31′ 37″, 2h. 48′ 7″, 3h. 7′ 37″, and 3h. 47′ 57″. The first two pictures show nothing remarkable in their appearance other than being very faithful records of the appearance of the obscuration at those times; but the third picture has a very well-defined mock sun by the side of the real solar disc. This picture was taken at the time of greatest obscuration, and the solar image is therefore reduced to a very narrow crescent of light, with the two cusps pointing vertically downwards. This image is surrounded by a circular halo of light, commencing at about one-tenth of an inch from the image and forming a ring of about the same diameter. Nearly touching the outer edge of this luminous halo, and resting on an imaginary line which joins the two cusps is the mock sun;

* for the iodide or the iodine composing the sensitive material must be the only

this is a trifle larger than the true sun, being ·17 inch diameter, neither is it so bright, being only of one half the intensity in the photograph. The fourth photograph is also surrounded by a halo, and embedded in this luminous ring can be discerned another *parhelia*, the side nearest the true sun being however wanting. In the fifth photograph there may also be discerned a *dark* disc, occupying somewhat near the position of the mock sun in the others, but whether this is a true parhelia or is only due to the clouds with which the solar image is surrounded we are unable to say. The appearance of this phenomenon is of considerable interest, and we have dwelt at some length on the description, in the hopes that some other records of it may be noticed among the photographs which have doubtless been taken by many of our readers throughout the country. The explanation is involved in great obscurity.

Were it not that parhelia were not uncommon occurrences in some states of the atmosphere, and had on several occasions been noticed on one, and sometimes on two or three sides of the sun, we should be inclined to suspect that the appearance was due to internal reflection of the powerful light of the sun from some of the reflecting surfaces of the lens; and the axis of the camera not having been perfectly pointed to the sun, the reflected image might be thrown slightly to one side. This explanation can, however, scarcely be the true one, as it would not account for the visibility of the mock sun to the naked eye on some occasions. Some such phenomenon as this was, we believe, photographed by Mr. T. R. Williams, the well known photographer in Regent Street, on the occasion of the eclipse of March, 1858, and subsequently exhibited at several learned and scientific meetings, but we are not aware of any other recorded observations of the kind. The subject is one full of interest, and we strongly recommend it to the notice of those of our readers who succeeded in taking any photographs of the recent eclipse.

Some little excitement is now being created in scientific circles by a new electric light which has recently been introduced by Professor Way. The electric light, as ordinarily exhibited, consists of a pair of charcoal points separated from each other by a small fraction of an inch; and being connected with the opposite poles of a powerful voltaic battery, the interruption thus caused to the passage of the electricity causes a brilliant evolution of light and heat as the electricity bridges over the interval. So far there is no difficulty; but the carbon poles are constantly wearing away, and the space between them thus becoming larger soon presents a barrier to the further passage of the current, and puts out the light. In order to avoid this inconvenience many automatic lamps have been devised, in which, by the aid of clockwork, electro-magnetism, &c., the poles were kept at the proper distance apart. The new light of Professor Way entirely does away with the necessity of any such arrangements as these, and is, as far as can be seen at present, a complete solution of the difficulty of electric illumination. The light differs in character from that produced by means of charcoal points, and from the lime light, principally in its great volume, appearing, not as a single vivid point, but as a focus of considerable dimensions. It is of a white colour with a tinge of bluish green and very intense. The effect of its intermission at night is very striking, the glare of broad daylight being suddenly exchanged for darkness rendered visible by the moon looking unusually dim and red, by the effect of the contrast. The following is a brief description of the arrangements for producing this light, concerning which little is generally known :—A fine stream of mercury, which can be regulated according to the battery power and the volume of light required, passes from an upper to a lower reservoir, and is made to conduct the electric current, by means of which it becomes intensely heated, and partially dissipated in vapour. The vaporised mercury becomes subsequently condensed and proceeds to the lower reservoir whence it again issues when the upper reservoir is exhausted and the apparatus reversed. The evolution of light by the passage of the electricity through the fluid conductor appears, however, to be due, not alone to the heating effect, but also, as in the case of the light from charcoal points, to the intensity of the current employed.

This fact was confirmed by an examination of the battery employed, which, contrary to our anticipation, was an *intensity* rather than a *quantity*, or heating arrangement. The employment of the mercury stream as a conductor fulfils conditions which would probably be wanting in any other substance which could be used for the purpose of obtaining light by similar means. Thus, although some illuminating effect may be produced by heating platinum wire to whiteness by a quantity current, the conductor is deficient in those characters which enable us, by means of tension electricity, to obtain light from charcoal points, interrupted metallic conductors, and the mercury stream of Professor Way. It is obvious, moreover, that the constant renewal of the conductor renders it possible to employ a current of any degree of power, and which would be otherwise inadmissible. The vertical mercury stream must be considered as composed of a multitude of conducting globules, separated by an imperceptible interval, and thus affording the vivid spark which occurs in making and breaking contact with the metal. This hypothesis affords an explanation of the fact that an equal illuminating effect cannot be obtained with a horizontal stream of mercury, although the latter may be heated to an equal power. It should be observed that the apparatus of Professor Way, which may probably before long be used in lighthouses and for signalling, is rendered air-tight, so as to preclude the possibility of any injurious effect arising from escape of the vapourised mercury. This is the most important practical improvement in the electric light which has been made since Professor Holmes's introduction of the magneto-electric machine.

FROM A PHOTOGRAPHER'S COMMON-PLACE BOOK.*

RETURNING to Pegwell a day or two after I obtained from the other side of the village a capital collection of picturesque "little bits," such as are usually called "studies for artists." The best of them I got from a rugged, irregular, earth-bank beside the path,† crowned with some stumpy, ragged bushes, with weeds, flowers, grasses, bits of detached earth, twigs, roots, &c., at its base and sides, which "composed" into something really nice when selected with due reference to light, shade, and colour. The actinic influence of colour must, as I have said before, never be absent when you are calculating photographically pictorial effects. Camera artists do *sometimes* look for these "little bits," but when they produce them we too commonly find all their beauty lost, because the combined influence of light and colour has not duly entered into their calculations.

I don't know when I—the digressor—shall get to the end of these rambles, for here am I going off the track before I am fairly on it again, because it strikes me I can say something that may be useful to you about these aforesaid "bits."

The art-student commences his study of nature by painting such things as these : and coming to them as he does in the early ardour of his first, best, and truest love, he transcribes their beauties with a zest which gives them a very valuable and important influence upon his future studies. He will tell you he never had better practice than he had when his easel was set up before these lowly morsels of nature ; and such sketches are invariably preserved as the most valuable of notes for future reference throughout his career. Now, I conceive such practice would be no less valuable to young photographers, and would give them much more good experience of their art's capabilities, and difficulties, than they obtain from attempting more extensive views. Gainsborough gleaned some of his best ideas of picturesque effects by studying little bits of stick, stone, and looking-glass, combined with a few grasses and weeds; and I have heard very clever artists point out, with no little delight, all the more essential elements of a picture in a chance group of simple weeds and stones, which possessed beauty of form, chiaroscuro, and composition in a high degree of perfection. Burnet, in one of his works, points out a similar fact in regard to portraiture, showing how we have a picture complete in itself in an eye turned from the light. Breadth being secured by the cornea, which produces a mass of white (or light), and the iris and pupil, which give a mass of shade (or dark), the light and shade being focussed on a small portion of strong dark and strong light, which derive intensity from immediate contrast; then, by way of reflected light to clear up and give transparency and depth to the shadow, we have the light which passes through the iris, while the watery fluid at the bottom of the eye and the light on the eye-lid, together with its protecting lash, serve to give that detail or finish necessary to all works of art.

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* Continued from p. 219.

† "In general all banks are beautiful things, and will reward work better than large landscapes."—*Ruskin.*

Photographic landscapes seldom have good foregrounds,[*] and this I have frequently regretted, because conscious that nothing gives more interest or better effect. One of our celebrated water-colour landscape painters—Aaron Penley—says; "A good foreground often gives interest to a scene which otherwise would have nothing to recommend it." And this is undoubtedly true. Besides all this these studies are really charming pictures. I have before me while I write some excellent photographs of wild weeds, creepers, coltsfoot, and convolvulus; of a blackberry bush with the vegetation below it, of a group of ferns, and others of the like, and for variety of outline, breadth of light and shade, and general picturesqueness of effect they could not be surpassed. (I wish I knew their photographer's name that I might "Give the palm where merit points 'tis due," with all the honest warmth which his or her photographic *pictures* have origimated.) To study separately the parts of a landscape is to strengthen your knowledge of the whole, and, depend upon it, every scrap of such knowledge will have its effect in your productions.

If you are a young photographer, take my advice and commence by operating upon some foreground objects, such as rocks, bits of broken uneven grounds, with a few weeds, some of those sweet, shady little bits under hedges, a rustic stile, a beautifully rugged old stone wall, or a charmingly dilapidated, tumble-down old shed; choose your time with reference to a good effect of chiaroscuro, and if you can't make a picture of such subjects, take my word for it, you will fail most lamentably in views or scenes which you may think more interesting and important.[†] Of course in either case you may fail in pleasing your artistic friends, but in the first it will not be from choice of subject, and you must remember that

"Failure is no shame,
And cowardice alone is loss of fame."

A beginner should go to work for *study* not for *specimens'* and most of his earlier productions should be the result of experiments, to serve as notes for future reference, just as the painter's first efforts are. In fact very little advice could be given to artists, relative to their earlier studies, that would not apply with equal force to photographers, so near akin are their respective arts; only, so many of the latter lose the artistic in the mechanical, that few folk believe in the relationship.

"'Tis true,
'Tis pity, and pity 'tis 'tis true!"

One of the chief reasons of photographic "bits" of the character in question, being so spiritless and unsatisfactory, arises from the little attention given by the photographer to the rules of composition.

In my folio I have a foreground "bit" taken by a photographic friend, composed of ferns upon the sloping side of a hill, with a faint bit of distance beyond. The selection was excellent as far as the view chosen went, and every photographer will admire its photographic qualities; but nevertheless, it is a failure; which fact is due to my excellent friend's want of attention in the chiaroscuro (which is light, shade, and colour in our case, remember), the result being that the print is altogether one monotonous ineffective mass, no contrast, no breadth, no one part more prominent than another, no focus of light and shade. From his failure I hope he gleaned wisdom, and I am sure I did, as you may.

Thinking over all these things much as I have written them, save that they were then for my own benefit alone, I proceeded to take the little bits before referred to. In taking them I first looked for some one chief object, some tall weed in light against others in shade—some spray detached with bright crisp lights and well defined shadows from a background of half tints and reflected lights—some salient point of effect, some focus of light or dark—in short, some quality to give interest and artistic merit to my selection. Having found such in the course of my walk, I began to think about its colour, for you and I know very well that though it be vigorously detached from its background in nature, it may, if its colour have small chemical power, chance to have no more relief in my picture than dark grey would have against a grey just somewhat darker. In making the above remarks I allude more particularly to the law of "principality" in art, which teaches us that the unity of a composition demands that all its objects, features, or figures shall be in their degrees subordinate to that one which is from its position, superiority of form, effect, or importance, dominant.

"A prudent chief not always must display
His power in equal ranks and fair array."

As you have read the able articles on composition by Lake Price (concluded in the present volume) I need enter into no further explanations of this rule.

From the scenery about the spot from which I obtained my last bit, which was some little distance beyond the clump of coast-guards' cottages, I could have got some very nice pictures. There was one bit (you'll say I have got the bit in my mouth and have run away with you) which pleased me very much. The foreground was made by a stunted dwarf of an old oak, growing upon the extreme verge of the cliff, and throwing out its fantastically twisted, ill-clad boughs over the sands sloping up to the base of the cliff's rugged sides; beyond which lay the bold sweep of the bay, and a line of faintly defined distant scenery. Pursuing my way along the cliff until I came to a path sloping down its side among weeds and bushes to the sands, I found that another picture of equal value might be obtained by stationing the camera a little way from the bottom of this path and turning the lens towards Pegwell. In this case the picturesquely varied vegetation just beyond the path forms the foreground, the jutting cliff with the old oak, before described, overhanging its edge, combining with a more distant bit of cliff, and with a row of dilapidated posts and rails on the sands sloping upward from the sea—repeating and varying the lines—to make an excellent middle distance, while the sea beyond all completes the effect.

There was far more work about Pegwell than I had time for, and should you be photographing about Ramsgate you will not blame me for pointing out this locality, and describing some of its "bits." I think we will go to Minster next week, as I got something nice from there too, and it's a very interesting place to visit. So, till then, adieu. A. H. W.

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[*] The reason for this may be an optical one, it being almost impossible to secure good definition in the extreme or middle distance, and in the foreground also; but then arises the question, where can sharpness be dispensed with to least injure the result? I do not think the artist will say it is in the foreground, whatever others may affirm. I have seen pictures by Lyndon Smith, Bedford, Frank Howard, and Fenton with good foregrounds, in which the middle and extreme distance had not, apparently, suffered.

[†] Ruskin says, "Avoid all neat things. They are exceedingly difficult to draw, and very ugly when drawn. Choose rough, worn, and clumsy-looking things as much as possible; for instance, you cannot have a more difficult or profitless study than a newly-painted Thames wherry, nor a better study than an old empty coal barge, lying ashore at low tide."

WHAT IS LIGHT?

BY M. A. GAUDIN.

No subject is more appropriate to a photographic journal than that of Light; it is the source, the principal agent in photography; and moreover a profound mystery has, up to the present time, concealed the origin of light.

During the last century it was believed that light consisted in an emission from incandescent bodies, of excessively attenuated particles, which, once launched, travelled continually in straight lines, rebounding when they encountered solid bodies, making the angle of reflexion equal to the angle of incidence, and most frequently traversed these bodies themselves when they were transparent, that is, permeable to the luminous particles. This theory was put forth by Newton and La Place, and some geometricians and physicists of our days still sustain it, yet it leads to absurd results; for example, La Place did not hesitate to insert this singular proposition in his *Mécanique Céleste:*—

> "A luminous star of the same density as the earth, and of which the diameter is two hundred and fifty times larger than that of the sun, by virtue of its attraction, would not allow us to perceive any of its rays: it is therefore possible that the largest luminous bodies of the universe are invisible to us. A star which, without being of this magnitude, considerably surpasses the sun, will sensibly reduce the velocity of the light, and thus augment the extent of its aberration."

Thus, in virtue of the theory of emission, the suns are compared to cabmen hired by the hour, who, pretending to flog their horses, tighten the reins all the while. The truth is, the theory of emission is contrary to every appearance; no phenomenon of the material world authorizes so gratuitous a supposition; for independently of so comical a projection of the luminous particles, we must also admit their diversity, for there are red, orange, yellow, green, blue, and violet rays, besides calorific and chemical rays, each of which follows its own particular path in passing through a diaphanous body. This definition of light is of the same value as the "horror of a vacuum," which for a long time served to explain why water followed the piston in a suction pump; an explanation recognised as false as soon as it was discovered that water would follow the piston only to the height of 32 feet, representing exactly the weight of the atmosphere; and the effect of the suction pump is found conformable to the laws of the equilibrium of fluids.

Fortunately a definition of the nature of light exists which rests entirely on an opposite principle; this is *undulation*, according to which sound, light, heat, electricity, magnetism and gravitation are only peculiar undulations of different fluids, and it is the Theory of Sound, so clearly demonstrated at the present day, that gives every certainty to this origin of light. Thus sound is not only an undulation of the air; but also the undulation of some elastic body, either gaseous, liquid, or solid, and the velocity of the propagation of sound through any substance is precisely equal to the velocity of the undulation of the particles of this body. If, for example, the velocity of sound is much more rapid in water than in air, it is because the molecules of water oscillate much more rapidly. By combining the velocity of sound in water with the general formula of gravitation, we find that the velocity of sound in water implies a pressure of the particles of water upon each other equivalent to a force of 23,000 atmospheres; this is verified by its compressibility, which is only a twenty-three millionth for each atmosphere. In fine the undulation of any fluid is, generally speaking, a sound; but we give it different names according to the nature of the fluid and the resulting phenomena.

Thus sound, properly so called, is not transmitted through a pasty substance; light is not transmitted through metals any more than radiant heat, while dynamical electricity is transmitted only through metals: magnetism and gravitation are transmitted through all kinds of bodies.

We will now limit ourselves to establishing the properties of light, and then examine its origin.

Light is propagated with prodigious velocity, almost 155,000 miles per second; seven hundred thousand times more rapid than sound. The mechanical law of these two phenomena is the same; but the fluids and the pressure differ. In sound, it is air under a pressure of one atmosphere: in light, it is ether under a prodigious pressure.

Light traverses all bodies with the exception of the metals: thus a sheet of metal of the thousandth part of an inch in thickness completely intercepts the solar rays: in a much thinner sheet, part of the light is transmitted, and the other reflected. This occurs, without exception, to every imaginable body: thus bodies *blue* by transmission, such as indigo and Prussian blue, exhibit a *copper red* metallic reflection. Specularly, all intense red colours reflect green, as is seen is carmine of saffron: oxide of iron, the red hue of which is well known, produces the slate-blue reflection of hematite. The metals themselves follow this law: silver, which appears so white, is in reality slightly yellow; and this yellow is complementary to the violet blue transmitted by an infinitely thin film of silver. The reddish yellow reflected by gold is complementary to the greenish blue which passes through gold-leaf. This fact is general, and very well explained by supposing that white light is formed of a series of divers colours, and necessarily the colours transmitted must be deficient in the portion reflected: and if the incident light be white, the colour reflected is complementary to the white of the light reflected. There are a host of cases in which it is very important to note this: thus, if we observe a translucent body which gives a fine yellowish reflection, we may be certain that, when viewed as a transparency, it will appear of a rich purple colour: such is the effect of opaline bodies. Bromine, which is of so fine a red by transmission, is of a deep green by reflexion: iodine, which is blue by transmission, is copper-red in shining crystals.

The molecules of material bodies, so named by contrast with the particles of ether relatively imponderable which surround them on all sides, form organized masses through which the white light is decomposed more or less into its various elements; a single principal atom occupying the centre of a molecule, notwithstanding the presence of eighty or more inert atoms is capable of determining the decomposition of light, so that we may, up to a certain point, compare the molecules to bells capable of giving a certain sound, and vibrating their proper tone under the impulsion of the whole series of tones; this is a very faithful representation of self-coloured bodies.

In other cases the white light is separated into its various elements by simple refraction through diaphanous bodies, that is to say, composed of molecules which of themselves have no decomposing action. Light in penetrating a diaphanous material, under an incidence oblique to the surface of the medium, is deviated from its direct route, and this deviation is different for each colour, which determines their separation by another cause, and spreads them fan-like in the plane of incidence to produce the spectrum upon a screen placed beyond some transparent body.

The coloured rays are more and more deviated from their route in the following order:—

Red	1·240
Orange	1·166
Yellow	1·102
Green	1·042
Blue	0·930
Indigo	0·898
Violet	0·846
The chemical or photogenic rays.	

The deviation is in relation with the rapidity of the undulation, for as all the rays travel with the same velocity, the greatest number of undulations in the same time will be with the rays of which the undulations are shortest, and principally for the violet ray which is 846-thousandths, while the red ray is 1·240-thousandths; and still more for the chemical rays, of which we have not yet ascertained is very great, enhancing the cost of the water as much as 15 per cent.

Now in every distribution of public waters, the water is brought to the houses under some degree of pressure. This pressure is sufficient to cause the water to pass through an hermetical self-cleansing filter, and at a rate sufficient for the wants of the most populous house. Other means, more expeditious but less suspicious, may therefore be rejected.

There now remains the third difficulty, that of temperature. It is very easily resolved. In the Venitian cisterns we can always have cool fresh water, that is, of a temperature below 60° F., which is always desirable in drinking water, both in summer and in winter, and easily attainable, for the simple reason that the cisterns are sunk ten feet below the surface of the earth. In large cities, where bituminous coal is burned, the roofs of buildings contain so much soot, that rain-water collected from them is not potable unless some means be taken to throw off the first portions that flow after a shower of rain begins. After the roofs are washed the rain-water collected is tolerably pure, and may be made completely so if treated with magnetic oxide of iron, according to Mr. Spencer's plan.

Certain eminent Spanish *savans* are occupying themselves with the project of a universal language. This project, the revival of one made by Raymond Lully, has been generally well received, and it already reckons numerous partizans among men the most intelligent and enlightened, scientific, literary. and political. The "*Sociedad de la Lengua Universal*" has been founded with the view of bringing about the adoption of a universal language. Among the members we find the names of Martinez de la Rosa, Olozaga, Infanta. Tejada, Alcalá, Galiano, Luxan, Gomez de Caserna, Pacheco, Duke de Rivas, Marquis de Molins, Marquis de Cervera, Count de San Luis, Monlau, and Sotos Ochando. To the latter belongs the honour of taking the initiative. He can boast of being seconded in his gigantic enterprise by men of distinguished talent and strong faith. The Society of Universal Language, at its second sitting, approved of the statutes regulating it. A commission has been formed to direct the linguistic labours, it is charged also with presenting new members, associates, correspondents, &c. For a moderate contribution of about four shillings per quarter, each member will receive gratis the statutes, the grammar, and the dictionary of the universal language, the journal, and all other publications of the Society. The parties concerned appear to be very sanguine of success.

Dr. Clauss has made a complete comparative study between ruthenium and osmium, the following are his general conclusions:—Ruthenium forms with oxygen, sulphur and other haloids, the same combinations as osmium; these combinations are formed simultaneously, and present, in some rare cases, the same properties, in many cases analogous properties, but most frequently different properties; these differences refer especially to colour and taste; the forms remain identical, especially when the combination is crystallized; the identity is still more remarkable with the double salts. The principal difference between these two metals consists in the aptitude that one of them, the ruthenium, to the exclusion of the osmium, of passing by degrees to intermediate combinations. Thus ruthenium easily gives birth to sesqui-oxides and sesqui-chlorides, more difficultly to oxides and chlorides, while the contrary takes place with osmium. The four degrees of oxidation of ruthenium are known as follows:—RuO, Ru_2O_3, RuO_2, RuO_3, parallel to those of osmium; but the combination RuO_4, or ruthenic acid properly so called, corresponding with osmic acid, is still wanting.

Blisters and Stains in Collodio-Albumen Process.

Dear Sir,—I am surprised to hear that *blisters* and *stains* are *ever* met with in the collodio-albumen process, not merely by amateurs of small experience, but by such operators as Messrs. Petschler and Mann. In working this almost perfect process I am *never* troubled now with either of the above annoyances.

My method of avoiding the first annoyance is by a *preliminary coating of the plate* with albumen, of strength, say 1 ounce of albumen to 6 ounces of water, to be carefully filtered before use; or (which is perhaps rather more convenient to spread), a solution of 2 grains of gelatine to 1 ounce of water, with addition of a little methylated alcohol, as suggested by Mr. Hardwich some time ago. With this *any* collodion may be used, and the plates thus treated will bear any *amount of washing or soaking without* the film rising in the least.

Next I think the use of pyrogallic acid ought to be condemned—I always use gallic. Those who complain of the slowness of it must remember that nothing is required but to place the plates in a dish with sufficient of the solution to cover them, and they may be left until finished; the operator may either look on with placid inactivity, or retire to enjoy his weed and jorum of beer.

The other evening, after taking six pictures, I placed them in gallic acid (which occupied me about five minutes), and then went off to the theatre. The solution of course was made weak so as to allow of a long development. On my return all were developed, or at least five minutes in a stronger solution fully completed the development; and much better pictures they were than they might have been had I remained with them, for I must confess that sometimes in my haste to finish the development I make free use of the silver bottle.

But further, I deny that the development with gallic acid is necessarily much slower than with pyrogallic.

If the solution be warmed to about 100°, the picture, if sufficiently exposed, *will appear in less than two minutes*, and be fully developed in half an hour. I fancy that the water, when warmed, dissolves a larger proportion of gallic acid, and this will in some measure account for the acceleration. I have a small stone bottle, into which I put the gallic acid and water; I let this stand on the fire range until a proper temperature is acquired, which is a work of but a few minutes.

One very great source of stains is the *too free use of silver* in the developer. About 10 drops of a 5-grain solution is sufficient for each ounce of developer, at least until *all* the details both of light and shade have appeared.

The exposure is a point in which many err; not one plate in ten being sufficiently exposed.

I have received very great assistance from Mr. Woodward, of Nottingham, with whose excellent pictures, by this process, every reader of the News ought to be acquainted. Had not my method of working differed slightly from his I should not have made this communication.

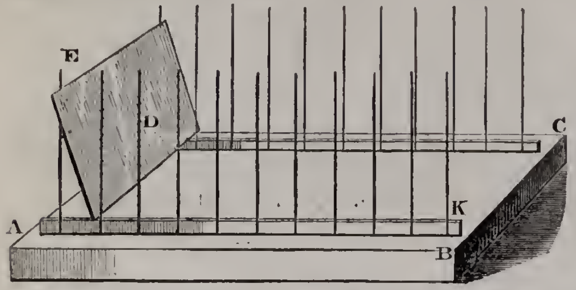
The reason that he is not troubled with stains is, that besides being a most expert manipulator, he uses his pyro-developer *very weak*—1 grain to the ounce—*and adds but very little silver;* but in this case the plates develope comparatively slowly, require constant attention, and he cannot attend to twelve at once, much less leave them for *pipe* or *theatre*.

As he only works stereoscopic size I am unable to say whether he could keep the film on 10 by 8 plates (the size I am working), without some preparatory coating. I should almost fancy he could not.

If the experiments made by Mr. Ackland, and recorded in your last number, are conclusive, I fear the modification proposed by Messrs. Petschler and Mann will be comparatively worthless. Suppose you are on a tour, and wish to work 12 or 18 plates daily; each plate according to Mr. Ackland's statement, requires *half an hour's soaking*, it will therefore be necessary either to carry about a large number of dishes or to *spend six or eight hours every evening* in the pleasant task of soaking plates for the next day's work. By the method at present in use 18 plates can *with case*, be sensitized and washed in the hour.

Although, perhaps, hardly pertinent to the object of my letter, I wish to draw the attention of all who feel interested in this dry process, to the beautiful views just taken by Mr. Woodward in South Wales, at Lichfield, &c. They will serve not merely to maintain, but to increase his reputation as an *artistic* photographer, as well as skilful manipulator. Nos. 205 and 211, exteriors of Tintern Abbey; and 235 and 237, of Lichfield Cathedral, are perfect.

I have devised a very convenient rack on which to drain plates after albumenising, &c.



A B, a board about an inch thick, of length and breadth to suit the size of plates to be worked. Into this are driven wires at distances of about an inch from each other. Along the feet of the wires a strip of glass is set upright for the plates to stand on.

The wires being varnished with shellac varnish, and only touching the backs of the plates, cannot produce stains.

The friction of the roughened edge of the glass A K will retain the plate at any angle of elevation at which it may be placed.—Yours, &c., D. H.

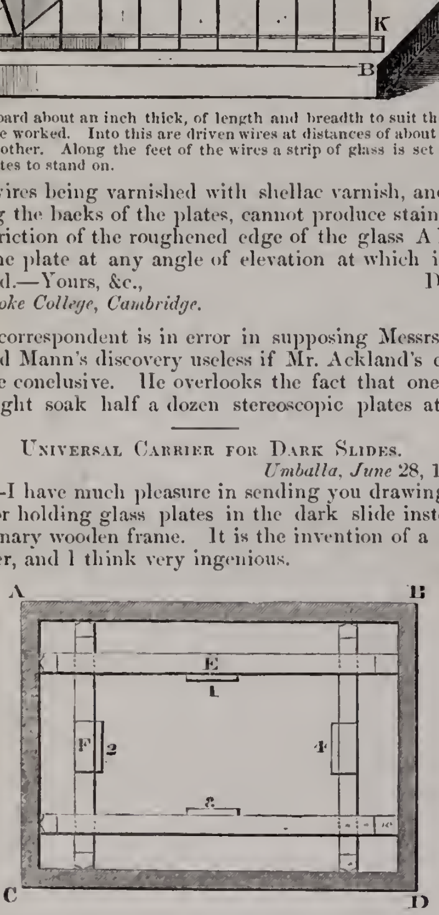
Pembroke College, Cambridge.

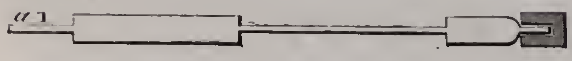
[Our correspondent is in error in supposing Messrs. Petschler and Mann's discovery useless if Mr. Ackland's experiments be conclusive. He overlooks the fact that one large dish might soak half a dozen stereoscopic plates at once. —Ed.]

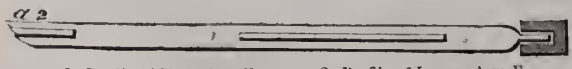
Universal Carrier for Dark Slides.

Umballa, June 28, 1860.

Sir,—I have much pleasure in sending you drawings of a frame for holding glass plates in the dark slide instead of the ordinary wooden frame. It is the invention of a native carpenter, and I think very ingenious.







a 1. Profile of Short Arm F. a 2. Profile of Longer Arm E.

A, B, C, D, in the diagram is a frame of hard wood, made to fit the dark slide, the thickness of an ordinary frame, about half an inch wide. E, and F are flat brass rods which run in a groove in the wooden frame, one rod sliding in a slit in the other. The plate rests on four small projections, one in the centre of each bar, about an inch long and one-twelfth of an inch wide.

The frame will hold, therefore, any size glass by moving these brass rods backward or forward as wanted; thus supposing the size of the wooden frame to be 13×11, one frame would do for all the glasses smaller than that, 10×12, 8×10, 6×5, 5×4, 4×3, instead of having five frames of the ordinary construction. It is so simple, and yet so ingenious. I wish I was able to explain it better, I hope, however, from the drawing you may understand it.

P.S.—I think photographers are much indebted to "Theta" for his admirable printing and toning formula.

Kureem Buksh.

[Some queries of our correspondent and answers to them next week.—Ed.]

Photographic Notes and Queries.

Caoutchouc for Covers to Baths, &c.

Sir,—Would you have the kindness to answer me through the columns of the News, the following questions:—1. Will the caoutchouc used for the covers of water-tight baths *really injure the silver solution?* 2. Will common table salt do to add to the albumen in the "New Collodio-Albumen Process:" and must liquor ammonia be added to albumen likewise?—Yours, &c. R. M.

[1. Caoutchouc, if pure, will not injure the silver solution; if, however, it be vulcanized, the case is different, as the sulphur mixed with it in the process of vulcanizing will inevitably be injurious. Sheet india-rubber prepared without vulcanizing should be used for the purpose. 2. Common salt will do. Ammonia is not necessary.—Ed.]

Toning Difficulties.

Sir,—I believe that many of the "toning failures" so piteously described in your columns, are caused primarily by the use of bad albumenised paper. Secondly, by putting too many prints at the same time into the toning or fixing bath; this invariably produces reddish coloured spots. Thirdly, from the fixing bath being allowed to become too weak; this produces measly, greasy spots on the pictures. I print to a considerable extent, and find that it is best always to slightly warm the toning bath after putting in the soda and gold; my paper I buy of Mr. Hughes, in Oxford Street, and I do not think any one will regret giving his paper a trial. As to the blister failures, these I conceive arise from rolling the albumenised paper under too great a pressure, which breaks the cells of the albumen and allows the solution to permeate, and by that means produce blisters; in my own case I have never yet found that blisters did not go down on drying, which ought to be conducted in a warm room, not as some amateurs do, simply hang up the print by one corner, and let it take its chance, till a wet day or a dull Sunday comes round, and then look at the production.—Your obedient servant, R. Gordon.

[It is perhaps difficult to state the exact reason for the blisters referred to; most probably they arise from the size of the paper becoming to some extent decomposed by the alkaline gold toning bath. We have generally observed that it is in the case of highly-sized papers they occur, in which the albumen has only come in contact with the size, not with the absolute texture of the paper. Thus, on the slightest decomposition of the size the albumen would be likely to separate and rise in blisters. The cells of the albumen are all broken, or should be, in preparing it for application to the paper.—Ed.]

Ross, 8th September, 1860.

Sir,—As a professional photographer, I beg to offer a suggestion to "Mr. Thomas Lewis upon *Toning Difficulties.*"

Wash your prints for one hour in running water on removal from the pressure frame; then immerse for three minutes in

Liq. Amm. Fort.	1 drachm.
Aqua Pump.	1 pint.

Wash three or four minutes; then place in toning bath—

Chlor. Aur.	1 gr.
Phosp. Soda	20 grs.
Aqua Distill.	4 oz.

until toned (with the paper he names; this is the only plan to succeed).

Next wash five or six minutes in running water; then fix in

Hypo	1 oz.
Aqua	4 oz.
Carb. Soda	½ drachm.

Wash fifteen to twenty hours in running water.—Yours faithfully, W. H. WARNER.

IMPERFECT FIXATION.

SIR,—I have some experience as an amateur in photography, but am unable to account for the difficulty I find in vignetting. I have tried several, and all with the same result. The plain proofs come out white and clear as I print them, well or ill; the vignettes always turn brown. My albuminised paper is over a year old (Sandford's); it gave me very good vignettes with a toning bath (Hardwich's) up to a month ago (and a very old and much-used one, too); but I have lately adopted the alkaline chloride of gold, and can get fair results, except for vignettes. Can it be that the extra exposure required when a vignette glass is used can affect the paper? It may be well to observe that I use large camel-hair brushes in applying the chloride of gold: first, washing well; then steeping in salted water; then washing thoroughly; and, afterwards, applying the chloride of gold until I get a proper tone. I wash again, and apply hyposulphite in the same way with a soft brush until I find the proof changing colour, *i. e.*, losing its bright violet tint, and becoming dull and brown; I stop then, and wash well. Up to this point all has gone on well. The brown tint comes out in the subsequent washing. I should have blamed my manipulation, but that other plain proofs, toned precisely in the same manner, have turned out as well as the negative deserved. If you can suggest the causes of my difficulties, you will oblige your subscriber, N.

[Our correspondent incloses specimens illustrating his statement: an unvignetted print of a good tone and pure in the whites, and two vignetted pictures of a dirty yellow tint. We can arrive at no other conclusion, however, than that the vignetting has nothing to do with it, and is a mere coincidence. The vignetted prints are unmistakeably the victims of imperfect fixation. The hypo has been too old or too weak, or it has not sufficiently permeated the paper; in any case, its action has been imperfect. The first action of the hypo bath is to convert the unaltered chloride of silver into hyposulphite of silver, which is only soluble in *excess* of hyposulphite of soda. If, therefore, the hypo bath be old or weak, or if its action be not sufficiently prolonged, the hyposulphite of silver is not dissolved, but remaining in the paper begins to decompose and produce the dirty yellow or brown and measly appearance in the prints. Your method of applying the hypo with a brush is rarely safe, and especially with a stout, highly-albumenised, and somewhat horny paper like the samples forwarded. We admire your photographs; the vignetted landscape, if it had been perfect, we should have prized especially.

Your second communication confirms us in our conviction above stated. Use stronger hypo and use it fresh; immerse the print in it, and allow it to remain a sufficient length of time. Take care also that it is either quite neutral or slightly alkaline.—ED.]

ADJUSTING CAMERA SLIDES.

SIR,—The following plan of testing the accuracy of the adjustment of camera slides will, I think, commend itself to your inquiring correspondents from its extreme simplicity and correctness. Focus some object, excite a plate, place it in the camera, draw up the slide. Under your black cloth open the outer door of the slide, taking care not to let the glass fall out. If your slides are correctly adjusted you will see a clear and beautiful representation of your objects on the sensitised film.—I am, yours truly, E. B.

[The method here recommended is very simple and satisfactory so far as ascertaining whether the adjustment be correct or not is concerned; but suppose the adjustment be not correct, this method does not indicate the direction of the error. The method given in our answer to "Tyro" last week at once points out the error and the remedy; for by measurement it is ascertained whether the plate requires moving backward or forward.—ED.]

TRANSFERRING POSITIVES TO PAPER.

SIR,—If your correspondent "SPX." will try the following, although not new, he will find it answer his purpose:—Dissolve some shellac in boiling water with a little borax, grind some lamp-black with it, coat the positive smoothly (using a camel-hair brush), and allow it to dry. Then coat a piece of paper of the required size with the same mixture, and while wet place in on the positive, rubbing it firmly to prevent bubbles. Let it dry thoroughly. Then immerse it in water for a few minutes, and the whole of the film will leave the glass.—I am, Sir, yours obediently, R. E. X.

Talk in the Studio.

SOUTH LONDON SOCIETY.—The open-air meeting of the society will be held to-morrow (Saturday, Sept. 15th,) at Epping Forest. The rendezvous is appointed at "The Eagle," Snaresbrook, at 2.15 P.M. At present the weather promises to afford them the first pleasant day for landscape photography their meetings have yet seen.

AMERICAN PHOTOGRAPHY.—We have recently been favoured with an inspection of a gigantic photographic portrait of Mr. John Cassell, who has been for some time past visiting the United States. The picture is about twenty-four inches square. It is a standing figure, in a simple, easy, and natural position, well balanced by accessories; and is, we are assured, excellent as a portrait, although it strikes us as considerably stouter than we remember to have seen that gentleman. The photograph is on plain paper of an excellent tone, full of detail, and well managed as to chiaroscuro. Being touched considerably with the pencil, we can only speak of it as a picture, although the photograph appears to have been of sufficient excellence to make us desire we had the details of its production to lay before our readers. We do not know, however, whether it is the result of a negative taken the full size, or the product of an enlarging process. It is, we understand, from the *atelier* of Messrs. Fredericks, of New York, the gentlemen, if we mistake not, who have recently gone to a heavy expense in resisting the bromide patents. The name of the operator who produced this picture, Mr. De Bone, is mentioned by these gentlemen, an example we should like to see followed.

THE ECLIPSE.—It is understood that a large volume will be published under the direction of the Astronomer Royal, devoted to the records of the different astronomers of the Himalaya expedition.

TWO WAYS OF LIFE.—A correspondent in Edinburgh writes to say that our statement as to the remaining copies of this beautiful work was not quite correct, as he has a fine copy for sale. We referred to the remaining *stock;* we could not, of course, be supposed to say that any fortunate possessor of a copy would be unwilling to sell it for a consideration. We were not writing an advertisement last week, or we should have added that the copies we referred to were now offered at half the original publishing price.

MAJOR CALDESI.—Signor Caldesi, the well-known photographer of Raffaelle's cartoons, writes, in the interest of his firm, to disclaim the allusion to his name by the *Times'* special correspondent as one of Garibaldi's staff officers. He adds, with pride, however, that the gentleman referred to is his brother, Major Vincenzio Caldesi.

NEW POSITIVE PROCESS.—We are informed that a scientific amateur has recently discovered a process for the production of direct positives of surpassing beauty. Particulars will be given in a paper to be read in the coming session of the societies.

To Correspondents.

⁂ Our Correspondents will aid us in our endeavours to solve their difficulties if they will in all cases state details of their operations when failures occur; and when referring to former articles in the NEWS giving the exact reference. Signatures, such as "Positive," "Subscriber," and others of a like nature, should be avoided, as it sometimes occurs that two correspondents make use of the same signature. Initials are generally best. Letters intended for the EDITOR should be addressed expressly to him.

AMATEUR AND SUBSCRIBER.—The tones you desire may be obtained by almost any of the modifications of the alkaline gold-toning bath. The bath, as originally proposed by Mr. M. Lyte (in the number sent) gives excellent results. Use good albumenised paper, a strong silver bath, print deep and tone a shade deeper than you require in the finished print. The specimen you enclose is very good. Perhaps, as you remark, a thought too red. We intend in this or the next number to give the details of the printing process practised by one of our best metropolitan operators.

TIT TAT TO.—See answer above. The recipe will be given in the article referred to.

W. R.—We do not quite understand our correspondent. How did he burn the old hypo bath with his paper cuttings? In any case the hypo should not have been added; but the silver from it precipitated as a sulphide. It is a better plan always to wash the print on coming from the pressure frame before immersing it in the toning bath; for the double reason of removing acidity and saving the silver. We have known stains sometimes arise in doing this; but it has always been the result of washing in dirty dishes. It is a common custom to wash the prints before toning in some of the trays used for washing after fixing, and without the greatest caution it is impossible to say that some minute trace of hypo does not cling to them. This trace would inevitably cause a stain.

GEO. WILLIS—We have sent a communication by post.

LUX.—Chloride of silver prepared by the action of dry chlorine gas on silver, and preserved from contact with moisture and organic matter is not sensitive to light. We have a very beautiful sample prepared and presented to us by Professer Taylor, which was produced by the action of chlorine gas on silver foil. The skeleton form of the silver leaf is fully preserved, and the colour remains of an exquisitely pure white, notwithstanding that it has been for some months exposed to the action of light. It is preserved in a stoppered bottle.

A. P. HAMILTON.—We will endeavour to make the necessary enquiries.

G. F.—We believe the enamelled iron plates, or melainotype plates as they are called, are kept by many dealers. [See Advertisements].

W. BEARDON.—We prefer the Saxe paper. It is generally better in colour, more free from spots, and tones more easily.

I. S. L.—If you develop over a dish and preserve the contents, the deposit will be metallic silver.

W. H. H.—In the formula you mention the saturation with iodide is doubtless understood. The simplest way to do this is to coat a plate with iodised collodion and leave it a few hours in the bath. If the bath be not saturated with iodide to commence with, the effect will simply be that the first few plates attempted to be excited by leaving them in the bath the usual time, will be robbed of a portion of their iodide, and be insensitive in patches. For a positive bath substitute a trace of nitric acid for the ascetic acid named.

A. DRUMMOND.—You do not sufficiently detail particulars of your working to enable us to point out the cause of your difficulties. Probably under-exposure, or under-development is the cause; or possibly your fixing solution is too strong, and destroys the image.

POSITIVE.—Good strong common paste is as good as anything for joining leather generally. Perhaps for joining the leather corners of a bellows camera, good glue will be better, as it will set sooner and keep the joint in its place. Cement is not suitable for the purpose. Some valuable hints on the selection and preparation of good glue were given under the head "Amateur Mechanic," p. 361 of the last volume.

J. H. PETO.—We cannot advise you to manufacture your own varnishes, as the process requires considerable skill and experience; to the amateur it is generally troublesome and expensive, and the result unsatisfactory. Spirit varnishes are generally hardest and toughest. A variety of gums are used, but sandrac and shellac are most largely used in spirit varnishes. Methylated spirit will answer perfectly well. The gum should be quite dry, and either pulverised or reduced to very small pieces. Gum dammar is very commonly used in what are termed "crystal" varnishes, the solvent of which is benzole. It is not a hard gum.

ANTIPODES.—The letter and specimens of our correspondent in Hobart Town have only just been received, but shall have immediate attention.

EXCELSIOR.—The toning bath of the Abbe Laborde, mentioned at p. 84, will give good results, and if the fixing be properly and carefully conducted, will give tolerable certainty of permanency. It is not intended to be used twice, although it may sometimes be done. The best plan is only to use sufficient for the batch of prints under treatment. Your other queries shall receive attention next week.

T. P.—When acetic acid without description is mentioned, glacial acetic acid is generally meant. Beaufoy's acetic acid is about one-third of the strength of glacial acetic acid.

NEMO.—We cannot tell where you can have seen a formula for a positive developing solution to consist of a saturated solution of protosulphate of iron; nor are we surprised at your continued failures. Twenty grains of protosulphate of iron to an ounce of water is quite strong enough for warm weather; to this add twenty minims of glacial acetic acid, and two minims of nitric acid. A slow development gives the best results. If your picture flashes out at once, it is over-exposed. The blue stains probably arise from insufficient washing between developing and fixing.

NITROS.—You are right. Excess of nitric acid in your nitrate bath will cause fogging as well as alkalinity. The kind of fogging is, however, different; the reduction of silver, when produced by nitric acid, giving a sparkling metallic effect. The remedy is much more simple than when excess of acetic acid has been added. Add oxide of silver in minute quantities to the bath until it give a satisfactory picture. Oxide of silver is very sparingly soluble in water, but it is nevertheless best to add it by drops of a solution in which it is held for the time in mechanical suspension. Oxide of silver is better in result, and at the same time more economical than adding an alkali; nitrate of silver being formed by the combination of the excess of nitric acid with the oxide of silver.

COPYRIGHT.—You are altogether wrong. It does not require much argument to prove that, when a publisher has paid a few hundreds of pounds, sometimes thousands, for the original of a picture, and then a few hundreds more for engraving it, he should have the sole right to any profit that may accrue from its publication. To say that "it is illiberal and exercises a restrictive influence on the diffusion of art, and the extension of art education," when he declines to allow photographers to copy and sell photographs of his engravings, is sheer nonsense. If art education languish for the aid of of pictorial piracy, the sooner it dies a natural death the better.

J. M. P.—The prints are faultless. We shall be glad of further particulars.

THE DICTIONARY OF PHOTOGRAPAY and the article on the POSITIVE COLLODION PROCESS, and some other articles in type are compelled from pressure of matter to stand until next week; as are also answers to some of our Correspondents.

EXCHANGE CLUB.—Those of our Correspondents who wish their names published in the next list will be so good as to remember that in publishing their names we assume the responsibility of implying that their productions are up to the mark in quality. It is important, therefore, that a specimen print be in all cases forwarded with the name. A few of our Correspondents in sending their names to be entered on the Exchange list, have not complied with this necessary requisition.

Some Correspondents have intimated that a revisal of the rules upon which the Exchange Club is conducted is desirable. We shall be happy to receive suggestions on this subject.

All Letters, Works for Review, and other Communications for the Editor, should be addressed to the Office, 32 PATERNOSTER ROW, LONDON.

Advertisements and Communications for the Publisher for the current number, to be addressed to the Office, 32 PATERNOSTER ROW, not later than 3 o'clock every Thursday.

the length, but which, by their position surely indicate a still shorter length.

We know now why the blue, indigo and violet are the most active rays, they are in fact the nearest to the chemical rays, and their short undulation proves that they possess a more energetic power than the other rays which become attenuated up to the red inclusively.

(*To be continued.*)

PHOTOGRAPHY AT SOUTH KENSINGTON MUSEUM.*

We now proceed to the evidence of the various gentlemen examined by the Committee touching the practice of photography at South Kensington Museum.

Henry Coles, Esq., Superintendent of South Kensington Museum, under examination:—

"350. *Chairman.*] Will you describe the collections of photography and reproductions?—The Photographic Department of the South Kensington Museum has arisen from a desire expressed by the various schools of art throughout the country to obtain specimens of the highest objects of art at the cheapest possible rate. During the Paris Exhibition the Emperor of the French was good enough to allow the British authorities there to have practically almost unlimited access to the collections of the Louvre, the Musée d'Artillerie, and elsewhere, and hardly any restriction whatever was placed upon the reproduction of any objects in those museums. As respects photography, I will show the Committee some examples of the uses to which it is turned (*producing some coloured photographs*). The Committee is perhaps aware that the collection at the Louvre is the richest in the world in objects of the class of enamels and crystal, and of course it may be presumed to be not at all likely that they will ever go out of Paris. By the good nature of the Emperor of the French, we were allowed to photograph and colour those objects, so that we are enabled to give our people the benefit of them at a comparatively insignificant rate. That is one illustration of photography. I have here another, which is a *fac simile* of one of Raffaelle's drawings. At a recent sale at Christie's a drawing not larger than that, and not finer in quality, sold for more than 200*l*. A *fac simile* of this drawing, by the agency of photography, and by the action of the department, any working man in the country may get for 5*d*. I would apologise for the department being something that looks like a trader, but I am afraid that it is Hobson's choice; either the department must be a trader, or the public cannot have the copies. I know, as a fact, that the Emperor of the French has not even allowed his own subjects to have the privileges which we are giving to our school of art; and I believe that unless the instrumentality of the Government had been exercised, the thing could not have been done.

"351. That is with regard to foreign Governments?—Yes.

"352. With reference to copying things at home, why cannot we leave that to private trade?—At the British Museum, the trustees could not permit the public to take out objects whenever they pleased to photograph them; it must be done by some one person in whom the trustees have confidence; accordingly they appoint a photographer, and by harmonious action between us and the British Museum, the same photographer acts for both. In our own department, it must be obvious that we could not give anybody the run of the collections, or allow them to have objects out when they pleased, with the risk of breakage; we have to take extreme precautions now that the objects are photographed by our own photographer, but it would be practically impossible to place the collections in the hands of the public to do the work themselves: passing on to another case, the University of Oxford did not hesitate at all to entrust its Raffaelle drawings to the department; I doubt very much whether they would have entrusted them to any other body but a Government department to photograph them: the same thing applies to Windsor Castle; the Queen has been so gracious as to allow us to photograph anything at Windsor Castle which the schools like to make use of and to allow the public to purchase them. Here is a photograph of one of the Holbein drawings (*producing it*), the original of which would sell for a good many pounds; but this, according to the tariff of the department, can be obtained for 1*s*. 1½*d*.; this is no competition with trade, because private trade cannot do it.

"353. You say that private trade cannot do these things; why not?—Because nobody would give it permission.

"354. Are there any regulations in the department which restrict its operations to things which would not be open to private trade?—We scrupulously avoid photographing anything which the public can photograph for itself. For instance we have had occasion to take photographs of trees for the use of our schools, and we have been applied to to sell them, but we have refused to do so upon that ground.

"355. Upon the ground that you would not interfere with the private trader?—Yes; and moreover, if the public desire to produce those things for themselves, there is nothing to prevent their coming and ordering from us what is called a "negative," and then they can print from it as many copies as they please.

"356. Mr. *Kinnaird.*] For trade purposes?—Yes.

"357. Mr. *Joseph Locke.*] Cannot they do that without coming to you?—They canot go into Windsor Castle or into the Louvre to take the negative.

"358. In places to which they have access they can do it precisely as you do?—Yes; but there we do not act at all.

"359. (*Chairman.*] As to the cost of that department, is it self-supporting?—I am in hopes that when it is in full action it will be. It has only been established during the last year, and at present, as in most cases of this kind, we have to get a little experience. We had not room enough at first, and we worked a little to waste; but even now it is very nearly paying its expenses, far more than the Ordnance Survey, which is a precisely analogous case.

"360. Have you anything more to add upon that subject?—I will hand in the ules upon which the public can obtain photographs. [Given on p. 225.]

"370. Mr. *Adderley.*] Has there been much sale for those photographs in the office?—There would have been a very large sale if we had been able to supply them; but our means of production at present are not at all equal to the demand; the public have a most hungry appetite for them.

"371. Is the demand chiefly from schools, or from the public?—Both; schools have largely demanded them, and so have the public who have come to the Museum.

"372. Mr. *Joseph Locke.*] Does that answer apply to all the photographs?—Yes; there is a run sometimes upon one more than upon another.

"373. Mr. *Blackburn.*] For all practical purposes those photographic copies are as useful for educational ends as the originals?—I should say, perhaps, that is a little stronger than the fact would justify; but where you cannot get the original this is so clearly like the original that it nearly answers the purpose. Of course, the thing itself has qualities about it which no copy in the flat can ever realize; you cannot get the translucency of the original, for instance.

"374. For educational purposes, is not the copy as available as the original?—A person who understands these matters, will not be content with the picture of the object if he can get the original; he would have a photograph rather than nothing.

"375. Mr. *John Locke.*] You were speaking of the photographs that have been taken of works of art at Windsor Castle, and at Oxford. By whom were those photographs of the Cartoons at Hampton Court taken?—By the same photographer.

"376. Were those taken for the South Kensington Museum?—Yes.

"377. Those are for sale at Colnaghis, are they not?—We allowed Colnaghis to have the facilities of the apparatus and stages that we put up; we applied to the Office of Works for permission to photograph the Cartoons, and we gave an assurance that they should be watched during the process, and the Sappers were responsible for lifting them up and down. We went to some expense for apparatus, and we did the whole business most carefully. We were asked if we had any objection to Colnaghis on their own responsibility doing the same, and we had none at all.

"378. In fact, Colnaghis made those photographs upon their own account?—Yes; if they could do it better than we, so much the better for the public; at all events we were willing that they should try.

"379. Was there any offer made by any persons with respect to photographing the works of art at Oxford or Windsor?—No, only with respect to the Cartoons.

"380. Mr. *Stirling.*] With reference to these photographs which you have produced, are coloured photographs of this description sold at the establishment, as well as plain photographs?—They could be obtained, I think; there has been little demand for them. The coloured copies have been usually for the use of schools, and nessarily they cannot be made very cheap; a coloured copy like those which I have produced, and which I should say is the work of the students in the schools, would probably cost two guineas."

John Scott, Esq., was called in; and examined.

"856. *Chairman.*] You are a partner in the firm of Messrs. Colnaghi and Company, are you not?—Yes; and also in the firm of Caldesi, Blandford and Company.

"857. You have some statement which you wish to make to the Committee?—I should, of course, be desirous to answer any question which might be put to me, to show the sense which the photographic profession entertain with regard to the operations at Brompton in photography. I come here in obedience to a letter which was addressed to my firm of Colnaghi and Co., dated House of Commons, 7th July, 1860, signed Felix H. Webber, directing me to attend before this Committee at 12 o'clock this day; but I would not wish to intrude my evidence as a volunteer.

"858. Will you state the point to which you wish to draw our attention?—I wish to draw the attention of the Committee to this one fact, that the operations of the Department of Science and Art at Brompton, with respect to photography, have had the effect of entirely destroying photography in its higher branches as a profession. I am authorized by Mr. Roger Fenton, the President of the Photographic Institution, who is unable to attend, to state that since the establishment of photography at the Department of Science and Art, he has given up all the higher branches of photography, as he finds he cannot compete with the Government Department.

"859. Will you state in what manner the Photographic Department at the South Kensington Museum has destroyed the photographic profession?—By producing photographs at a price which renders it quite impossible for private individuals to compete with them.

"860. Can you specify those photographs?—The Cartoons by Raffaelle.

"861. Are there any others?—A collection of the works of Raffaelle, which were copied from drawings in the Louvre, I believe, were executed for the Department of Science and Art.

"862. Can you mention any other cases besides those you have mentioned?—I can only mention the general plan adopted by the department, which is to publish photographs at so much a square inch.

"863. You do not allude to any other photographic works?—I cannot without having a list before me; but presently I will refer to their price catalogue. But I shall seek to establish the principle for which I contend by showing the effect produced on the profession by the publications of the department, and the conditions on which they execute photography in general for the public.

"864. Sir *John Shelley.*] Would you state without specifying particular subjects, whether there are other subjects which you would be prepared to bring before the Committee?—I would make this statement, that according to the catalogue of the department which came into my hands for the first time yesterday, they sell photographs at 5*d*. for a size of five by seven inches, at 7½*d*. for a size of 40 square inches, at 10*d*. for a size of 60 by 80 inches, and at 1*s*. 0½*d*. for 80 by 100 inches. Those prices, of course, completely prevent all private individuals competing with them. It puts the entire monopoly of photography in the hands of a Government Department armed with the power to do that with the public money, which we have to perform with our own."

(*To be continued.*)

Continued from p. 225.

Critical Notices.

ON THE INVENTION OF STEREOSCOPIC GLASSES FOR SINGLE PICTURES: with Preliminary Observations on the Stereoscope, and on the Physiology of Stereoscopic Vision. By T. Wharton Jones, F.R.S. London: John Churchill.

This is a well-written and interesting pamphlet on the subject of Stereoscopic Vision, the rationale of which is familiarly explained. There are some excellent remarks on the unnatural effect of stereographs taken by lenses further apart than the human eyes, with which we entirely agree.

"In the Stereoscope, the relief or intaglio of the subject almost always appears much greater than is seen in nature. This is owing to the dissimilarity of the two perspectives of the slide being made very much greater than that which the perspectives received by the two retinæ from the real object could by possibility present, with the eyes placed as they are in the head at so short a distance apart. The great dissimilarity of the two perspectives on stereoscopic slides is intentionally produced by placing the two cameræ, by which they are respectively taken, at a considerable distance from each other. By this contrivance, such different perspectives are obtained as could only be actually seen by the eyes, placed as they are, if the subject were a small model viewed at a short distance. The appearance seen from such a slide in the Stereoscope is, therefore, such only as could be presented by a small but exquisite model. It is an appearance impossible in nature, though in so many respects natural-looking. If the eyes were placed in the head more widely apart (an arrangement, however, for which a much greater breadth of head would be a necessary condition), we should, indeed, be able to see distant objects in greater relief than we do—more nearly like what the pictures in the Stereoscope appear; for in that case we should receive on the retinæ more dissimilar perspectives of them.

"Exquisitely beautiful as the views in the Stereoscope are, they are thus not such as can be seen in nature, if the objects represented be at any distance, as they must be in order to be all seen when large. Stereoscopic views from less dissimilar perspectives than are commonly taken—from perspectives more nearly like what could be naturally projected on the retinæ from real objects—though less striking for their relief or intaglio, would be much more natural, and in the end, perhaps, more pleasing. Even real objects of small dimensions, viewed near, are not seen in such strong relief or intaglio as that in which the objects in the Stereoscope are commonly made to appear."

The final chapter is devoted to the description of an ingenious contrivance of the author's by which some semblance of relief and distance is given to single pictures.

ACKLAND'S HINTS ON FOTHERGILL'S PROCESS. Third Edition. London: Horne and Thornthwaite.

This is the third edition of a very complete and instructive little work, which no manipulator in the Fothergill process ought to be without. Mr. Ackland has given much attention to the prevailing annoyances in this process, such as the "water markings," "wave-like stains," &c., and having traced them to their sources, points out the method to avoid the evil. The various operations, and the reasons for them, are described with much detail and minuteness, so that it is impossible for the veriest tyro to misunderstand them. The "Concluding Hints," which consist of a *resumè* of the operations and cautions as to causes of failure are important to all manipulators in dry processes. We here subjoin them:—

"Clean the glass plates carefully with very clean cloths, avoiding especially those used to wipe the hands after coating with albumen.

"Filter the bath solution whenever about to prepare a lot of plates; and, when not in use, keep it in a stoppered bottle, in a dark corner of the operating room, so that the full glare of daylight may at no time fall on it.

"Allow the collodion to set thoroughly before immersion in the nitrate bath, or it may become detached in washing or after fixing; but, as a matter of course, this must not be carried so far that any part may become dry, or the nitrate bath will act unequally on the film.

"Iodized collodion that has become too thick for use by evaporation, may be diluted with rectified sulphuric ether; but methylated ether must not be used for this purpose.

"After sensitizing the collodion film, wash as described, and do not allow water to fall directly on the surface of the plate, or unequal patches will show themselves in developing.

"The dilute albumen that has been employed to coat one plate must be thrown away, and a second quantity taken for the next plate.

"Use two globe plate-holders, one for collodionising the plate, and the second for coating with albumen, but carefully avoid using the one ordinarily employed for the albumen to coat a plate with collodion, as albumen would thus be introduced into the bath solution, which would speedily spoil it for the purpose.

"Handle the coated plate as little as possible, and always wash the hands after coating with albumen, before removing another plate from the bath; indeed, never take up a plate without washing and drying the hands on a clean towel.

"Give a full exposure in the camera, or the resulting negative will be harsh, and produce black and white prints without middle tints.

"Keep the glass used for the developing mixture perfectly clean.

"Take especial care that no gleam of white light falls on the plates during preparation or drying, and when dry, stow away in *light-tight* boxes of mahogany or tin, if not required for immediate use.

"In developing, take especial care that the developing fluid is kept on the move by being repeatedly poured on and off the plate, or mottling will be the result.

"Guard against over development, as a comparatively weak negative by this process will print well, owing to the nature of the deposit forming the shades having a greater action, in stopping the light whilst printing, than that produced by the ordinary collodion process."

The pamphlet concludes by describing a very simple and effective bath tester for ascertaining the strength of silver solutions, to which we recommend the attention of our readers.

OBSERVATIONS ON ARTIFICIAL LIGHT. By A. H. Renton, C.E.*

This is a pamphlet intended to show the immense advantages, general applicability, and cheapness of the light to be supplied by the Lime Light Company. The observations on this subject are full of interest and well worthy of the attention of photographers. The lime light is produced by the joint combustion of hydrogen and oxygen gases in very minute quantities upon a wick of lime. In brilliancy one light is said to exceed fifty common gas lights. As regards economy the light equivalent to fifty common gas lights may be produced for three halfpence an hour. As regards portability and general applicability, the writer states that "the light has been rendered so portable by the employment of compressed gases that a coast-guardsman can carry his charged lantern in his belt in the same manner as in the police force, the apparatus containing the supply of gases being secured behind him as a knapsack." In addition to these advantages there is no consumption of vital air by the lime light, that element so necessary to combustion being supplied artificially, so that no matter what the brilliancy of the light the atmosphere is neither exhausted of its oxygen, nor tainted with noxious vapours. Lastly, the light is stated by the writer to be the nearest approach to sunlight in purity and colour, "so that it is applied with perfect success to the purposes of photography."

NOTES ON THE SOLAR ECLIPSE OF JULY 18, 1860. By G. J. Symons, Member of the British Meteorological Society. London: Edward Stanford.

On no previous occasion has scientific observation of the various phenomena connected with the solar eclipse been so complete as on the 18th of July last, nor has photography on any previous occasion that we remember more completely asserted its importance as a scientific registrar. The pamphlet before us is chiefly devoted to a record derived from various sources, of the meteorological phenomena connected with the eclipse. Of primary interest to photographers is a photometric register of the various stages, made at intervals of five minutes during the whole period of contact. A variety of circumstances might, to a trifling extent, interfere with the perfect accuracy of this as a record of the gradual diminution and increase of actinic energy during the progress of the eclipse, such as the occasional clouding of the sun, or variation in sensitiveness of the paper, arising from lapse of time, &c.; but in spite of this the photograph which accompanies the pamphlet is an interesting illustration of the gradation of photogenic power which marked the period, and agrees with some experiments we made ourselves during the progress of the eclipse.

The following extract describing the simple and effective method adopted in registering the actinic changes will interest many of our readers.

"The paper, after having been sensitized, was fastened on a table by drawing pins; over it was placed a double thickness of the stoutest brown paper, somewhat broader than, and double the length of, the sensitized paper; this opaque covering had an aperture in the middle (about five inches by half an inch), other coverings were then put over, and the whole left in a dark room till required. When taken into the sunshine everything was removed but the perforated cover, the aperture in which being brought over a portion of the sensitive paper, that part was of course exposed to the sun, and therefore it was darkened. At the expiration of five minutes (read off from a seconds watch in front of the observer) the covering was shifted by the breadth of the aperture, the first portion being thus covered and prevented from increasing its depth of tint, and a fresh part exposed by a movement equally easy, instantaneous, and effectual. At the conclusion of the observations the photograph was taken again into a dark room, removed from the table, and fixed in the usual manner."

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* To be had at the Office of the PHOTOGRAPHIC NEWS. Free by post for four postage stamps.

Photographic Tourist.*

A FEW DAYS ON DARTMOOR.

On the twenty-first of the past month of August, the 9 p.m. down train from Exeter "landed" me at the pretty village of South Brent, situated on the river Avon or Aune, and directly bordering Dartmoor Forest. The object I had in view was neither more nor less than a few days' pedestrian tour over the moors, to me the most interesting part of the county of Devon, rightly called the Garden of England. My camera and a dozen dry plates, would, I hoped, weather permitting (a very needful reservation), furnish lasting and truthful memorials of some of the numerous Druidical and aboriginal vestiges which abound in every portion of this comparatively unknown region. Should photography fail I still had my sketch-book to fall back upon; but for such subjects I greatly prefer the minute truthfulness of our art to anything that can be got by the pencil.

From the appearance of the village as I walked down its principal street, it seemed as if it were customary, for the inhabitants to go to bed as soon as daylight departed, for not one soul did I meet. A "rushlight" here and there throwing its faint beams from a cottage window, only served to make the dreariness more gloomy, and I was almost surprised to find an inn open. Having secured moorings at Langworthy's "Anchor," I set out in search of an old playmate, whom I had not seen since we were boys at school together, and who was, I knew, residing in Brent. Indeed a strong desire to have a chat with him about old times, was my reason for taking this place as a starting point. I scarcely expected to see him that night, and so was not surprised on reaching his house, to find that although only half-past nine o'clock, all the household were in the land of dreams, and had been there, apparently "no end of time." Returning to the "Anchor" I got through my tea as quickly as possible, and with serious thoughts of apologising for causing such late hours, retired to bed a little after ten.

Next morning the weather was wet and miserable, but I arose at six, and ordering breakfast for seven, called on my friend C—, when I was more fortunate than on the previous evening. He failed to recognise me, for, as he remarked, the bearded man differed very greatly in appearance from the smooth-faced school-boy. Like so many others he had been smitten with the black disease, as I was not long in discovering. Some of the difficulties he had surmounted, but others he could not get over, and so was not sorry of the chance that threw in his way one able to set him right and give him a hint or two. Most of his negatives were covered with numberless holes, which I soon traced to dust and reduced silver in the bath.

After breakfast I strolled through the village, and noted several objects of interest to the photographer. The church, though small, is somewhat massive in style, and would furnish one or two pretty pictures. Some interesting "bits" could also be got on the river flowing close by, and which is here a considerable mountain stream. The village street, with its rustic cottages of every conceivable irregularity, and a rivulet running between the pathway and the road cannot fail to arrest an artist's attention.

C— having arranged to accompany me a short distance on my way, we set out, and presently crossed Brent Bridge, or as it is locally called, Lydie Bridge. The waters swollen by recent heavy rains came thundering over the massive rocks forming the river's bed. Instantaneous photography is the process for such scenes as this. Directly beneath the bridge there is a deep pool, which in one very dry season was dipped out by some young fellows who had a holiday of hard work, as C— quaintly remarked, partly for the "fun of the thing," and partly in the hope of getting a good catch of fish.

Fortunately the weather now began to clear, so that we could thoroughly enjoy the splendid panorama which opened to view as we proceeded. A short distance before reaching the moor-gate, C— called my attention to a fine old granite cross, of about six or eight feet in length, which he remembers to have seen standing, but the parish authorities having to construct a foot-path over a rivulet which crossed the road close by, could not resist the temptation of saving a few shillings by making use of this stone, which by good luck (!) happened to be so "handy." Following the river a little further up brought us to Shipley Bridge, which in itself is nothing to speak of. About fifty yards above it, however, the water tumbling over the rocks forms rather a pretty cascade, a photograph of which would be worth taking.

By this time we were fairly on the moor, for although this part is not within the boundary of Dartmoor proper, yet the large commons which border the forest are always spoken of as part of it. I shall have occasion hereafter to speak further on this point, but for the present will proceed on our way. Presently we came on a fine house which I was surprised to find in such a desolate spot as this. C— stated that the gentleman inhabiting it was very peculiar in many of his notions, not the least of which, I fancy, would be the choice of such place of residence. Not long since a large sum of mony had been expended in making preparations for quarrying granite. Tramways were constructed, and houses built for the overseer and workmen, but a short working soon proved that the stone would not come out in sufficiently large blocks to be serviceable. The whole affair was therefore abandoned, and this gentleman, who was deeply interested in the undertaking, converted the buildings into a mansion for himself. In summer the place would be pleasant enough, but in winter it would partake a little too much of the rural to please me.

Availing ourselves of a wooden bridge which the quarrymen had constructed, we crossed the river, and keeping well up on the hill noticed on the opposite slope numerous aboriginal enclosures, and hut circles, extending over several acres of ground. These places are generally known to moormen as pounds, or enclosures for cattle, and are frequently to be met with. The outer wall consists of large stones piled loosely together, and cover a space of perhaps from a quarter to half an acre on the average, but they vary greatly. Within this outer wall are the hut-circles, numbering generally from five to ten. These, excepting a rare instance or two, are of a circular form, as the name itself implies. In diameter they usually run from twelve to twenty feet, but I have met with a specimen upwards of fifty feet. The door-jambs in many cases still remain in their original positions, and are often from four to six feet in height and nearly the same in breadth. The hut walls were no doubt originally constructed in a similar manner to that in which the moormen in the present day build their "dry walls," and made wind-tight by earth and turf. This being roofed in, gives a very primitive building indeed, the only opening in all probability answering the treble purpose of door, window, and chimney. It has been supposed that some of these huts were occupied by the aboriginal families, while others were appropriated to the use of the cattle. At all events we may reasonably conclude that the outer wall was for the purpose of protecting both themselves and their families at night from the numerous wolves and other wild beasts which at that time infested this country. M. H.

(*To be continued.*)

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* "A Stroll on the Banks of the Thames" will be continued shortly.

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 12*th September*, 1860.

Among the applications of photography there is one I must name which, if not altogether new, is at least not common. It is well known that Art on the Stage has become a most recondite and expensive affair. Audiences are not to be satisfied, now-a-days, unless an opera, a drama, or a ballet is "mounted" with due regard to local colour, even to the minutest particular. Costumes, scenery, and appointments must in very many cases be under the strict supervision of the archæologist. Arms, furniture, and utensils must be modelled after satisfactory authorities; the *costumier* has become a profession apart, demanding no mean amount of antiquarian lore as well as artistic taste. With matters of this kind you have doubtless been made familiar in the revivals of the Shakespearean drama by Mr. Charles Kean; but I have never heard that he availed himself of photography to perpetuate in a pictorial manner the "materiel" which it cost him so much time, labour, skill, and money to produce. Here, however, the case is different. The directors of the *Opera* have set the first example of the application of photography to the perpetuation of the transient glories of the mimic scene of the Opera of *Pierre de Medicis*, and in future this step will be taken with all operas.

This intelligent example will doubtless be followed by the *Comédie Française*, which relies much more on tradition than the *Opera*, it and will be enabled to transmit to its successors most valuable records, which unhappily it has not itself received from its predecessors. The stars of the drama and the stars of the opera, now for ever set beneath the ocean of Time, what a glorious legacy their photographs would have been to our own era! Posterity, however, will not have to mourn the absence of that which we should have so highly prized. The example, once set, will surely be followed on every occasion that justifies it.

Every phase of the question of the nature and properties of light must be interesting to the photographer. Professor Govi, of Florence, has recently published some remarks on the polarization of light by diffusion; he says, that the polarization of atmospheric light has long ago proved that gas has the faculty of polarizing the luminous motion, as well as solid and liquid bodies. But I do not know that hitherto it has been attempeed to experiment directly upon gaseous bodies, in order to prove the existence of polarizing forces. The polariscopic study of the light of comets having led me to occupy myself with this question, I had the idea of examining what happened to a luminous ray made to traverse through a certain thickness of gaseous medium capable of diffusing or reflecting it.

I made a sunbeam, reflected by the mirror of a heliostat, pass through a round aperture into a camera obscura. This light, derived from a reflexion in great measure metallic, exhibited only feeble indications of polarization. I then caused a great smoke from burning incense to be produced within the camera, and then the luminous beam immediately became detached under the form of a white cylinder, diffusing the light in every direction. This light is seen to be very plainly polarized even when the cylinder is perpendicularly examined through its axis; but the intensity of the polarization is truly extraordinary in a direction at a small angle with this axis, from the side of the source of light; it might be said that in this direction the phenomenon was produced by the presence of a solid or liquid body. Starting from this direction the polarization sensibly diminished when looking at the cylinder, either when approaching the aperture or in removing to the opposite side. Even in the axis of the column the light was only very feebly polarized.

What seems to me to merit in this phenomenon the attention of physicists is, that the light polarized by diffusion does not appear to arise from a simple reflexion upon the gaseous molecules, seeing that the plane of polarization was perpendicular to the plane where the reflexion must take place. Then, when we study the column all around its axis, in the direction of the maximum polarization, we find the light polarized tangentically to the cylindrical surface.

It may be that the plane of polarization became deviated, in submitting to repeated polarizations from the gaseous particles, or that the action of the gas becomes analogous, under these circumstances, to that of refringent bodies. Experiments have not yet enabled me to decide upon this question. I have attempted to completely depolarize the light upon its entrance into the camera obscura, by making it pass through a sheet of thin white paper; the phenomena and the intensity remained almost the same. The polarized light proceeding from the reflexion from a black glass experienced no sensible modifications in the smoke. It is possible that in suitably regulating the quantity of incident polarized light, we should arrive at finding a limit to the action of the gaseous molecules beyond which the primitive polarization of the ray bears upon the molecular forces of the medium which the light traverses.

The relations which these facts may have with atmospheric polarization, and perhaps also with fluorescence and the natural colour of bodies, have induced me to publish these observations, however incomplete they may be found.

M. Dessaignes has demonstrated the intimate relation between malic and tartaric acid, by the fact that succinic acid is equally obtained by the oxidation of malic and tartaric acids.

The question of water-supply to great cities is one of the deepest interest. M. Grimaud de Caux has studied the general principles of this question, and solved the problem relating to the temperature and purity of public supplies of water. His studies have been conducted on a large scale, and continued for upwards of twenty-five years.

The first difficulty relates to the good quality of the water, which must be judged by its chemical purity and its lightness. The purest and lightest water is that from the clouds,—*rain water*; this is, in fact, distilled water, which, in passing through the atmosphere, becomes charged with air. It would be erroneous to admit that common drinking water should contain salts, because these salts suit some constitutions, and are favourable to the health of certain persons; there are other constitutions and persons to whom these salts may prove injurious, and a water intended for all must be equally good for all.

Next to rain-water comes *river-water*, running water derived chiefly from rain, the molecules of which are continually changing.

Then comes spring-water, the supply of which is more or less mineral, according to the substances it passes through and dissolves.

The best plan would be to collect the rain water and keep it in a Venitian cistern. But rain water does not always fall in sufficient quantity to supply every want; we must therefore have recourse to river water, and in default of that, to spring water.

The latter, besides its mineralization, is not always sufficiently light. It is desirable therefore to contrive the means of *aerating* it, either in making it flow in channels open to the sky, or in collecting it in reservoirs accessible to the sun and air.

But in aerating spring water, we incur the risk of depriving it of its limpidity and its initial temperature. This leads us to the second difficulty. In the distribution of public water, considerable quantities are generally operated upon. In London the quantity distributed every twenty-four hours is nine millions of gallons. How is it possible to clarify and purify so much water in so short a space of time.

It is usual to collect the water in reservoirs, and after the lapse of a given time to filter it through gravel and sand. The expense of these reservoirs and accompanying machinery

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PHOTOGRAPHIC FAILURES AND ACCIDENTS.

Who will write the book of failures? Success has ever found chroniclers. Painters, poets, and historians, have agreed not simply to chronicle, but to deify it, and mankind at large confirming the apotheosis have enthusiastically worshipped it. But failure, unrecorded, unhonoured, unsung, unowned in fact, hides its diminished head, ashamed if its very existence be recognized. And yet how often is failure the parent of success. Not simply the stepping stone as the trite proverb has it; not simply young success's ladder; but the actual progenitor, often, of unexpected and startling success. Failure as to the object pursued has often resulted in the discovery of something, compared with which the original quarry was altogether insignificant. The search has been for lead: the failure has been the discovery of gold. The gallant Columbus, as he dared the unknown dangers of the broad Atlantic, sought a western passage to India. He failed: but he found the magnificent continent of America. The alchymists of old sought the philosopher's stone and the elixir of life. They failed: but they laid the foundation of that beautiful science, to which we, as photographers, are so much indebted—chemistry.

The history of photography abounds with such failures. If we mistake not, the original discovery of one the most important principles in photography, the principle *par excellence* on which rapid photography is alone possible—the development of the latent image impressed by light, was the result of a failure. In the laboratory of Mr. Fox Talbot a batch of prepared calotype papers had been exposed under a negative, or what at that time was used in the place of a negative, the object being to obtain an *apparent* image. From some cause "failure" was the result. It was then suggested that the papers might again be made available for exposure by a second treatment with gallo-nitrate of silver, on the application of which, an image before impressed, but still invisible, was at once developed!

Independent, if not prior, discovery was made of the same fact by the Reverend J. B. Reade. Experimenting in the production, by the action of light on chloride of silver, of images given by the solar microscope, he remembered that Sir Humphrey Davy had remarked that the action of light was much more energetic on white leather, to which the solution of silver had been applied, than on paper. Having exhausted his available supply of white kid gloves, it occurred to him that if paper were prepared in a similar manner to the leather, so as to form, when the solution of silver was applied, what he then believed to be simply a tannate of silver, similar results must follow. An infusion of nut galls was prepared, and tried with success. So far we have neither accident nor failure; but simply the philosophical tracing of a consequence to its cause. All this, however, had reference only to the production of an *apparent* image; the development of a *latent* image was unthought of. Experimenting in this direction, on one occasion he did not succeed in obtaining the apparent image, and threw aside the papers as a "failure." Judge his surprise on glancing at the paper next morning to find it contained the image he had in vain tried to produce. The gallic acid in the paper had developed it. On another occasion, in order to intensify the action of light, which appeared provokingly slow in producing the image of the solar microscope on his prepared paper, he applied an infusion of nut galls to the paper whilst it was still under the action of light. A vigorous image was at once developed. This was an "accident." Here, then, were two facts, the results of a "failure" and an "accident," the legitimate induction from which was the theory of the development of a latent image.

Instances might be multiplied almost *ad infinitum* of minor discoveries, or important modifications of existing processes, arising from failure or accident. If we remember rightly we have heard that the discovery of the Fothergill process was an accident. The important modification of the collodio-albumen process recently discovered by Messrs. Petschler and Mann was an accident. And thus we might proceed, as examples crowd on our memory; but further illustration is unnecessary.

There is, perhaps, nothing very novel in this statement of the case. Most persons are familiar with the fact illustrated. We wish, however, to call increased attention to the importance of utilising the idea. Mr. Shadbolt, at a recent meeting of the North London Photographic Association, remarked that it often happened that more could be learned from the carefully detailed statement of a failure than from many successes. The same idea in various forms has often been expressed, and was dwelt upon at a recent meeting of the South London Society, a suggestion of a practical character arising out of the discussion.

Recorded facts are the food of inductive science, and should form the basis of all theory. Accidents and failures in scientific experiment often issue in results entirely different from those aimed at, and may, therefore, be regarded as unknown or unexpected facts, the careful and detailed record of which, must necessarily confirm known principles or suggest new theories, and in either case tend to the advancement of science.

We think, therefore, it was a happy suggestion made by Mr. Cotton at recent meeting of the South London Society, that an Album of Failures should be established; to which members should be invited to contribute specimens of any kind of exceptional, unexpected, and unexplained results which might occur in their practice of photography.

To give such contributions their full value, all the circumstances of their production should be carefully noted and detailed, so that any consideration or discussion arising on the subject may not be undertaken in ignorance of some important element in the case. In a science so young as photography accepted theories, are continually set at defiance by new facts. Explanations of exceptional phenomena, based on known theories without regard to their possible fallacy, must often therefore lead to error. What is wanted, then, from individuals is a simple and unvarnished statement of facts in regard to their failures; or at least—for this is an important qualifying clause—*such of their failures as ought to have been successes.*

This leads to another important qualification in the case, the necessity of precision in formulæ. Where photographers are in the habit of basing their operations on formulæ which might be described in such terms as:—"take a *portion* of this salt, and a *little* of that, dissolve it in *some* water; add a *few drops* of something else, and complete the operation by adding to the whole a piece of the active agent in the matter about the size of a *lump of chalk*," what definite results can they expect? Where disregard of precision in formulæ prevails and slovenliness in manipulation is habitual, "failure" should be the normal result, and success the "accident." From the contributions of such photographers defend the Album of Failures, or otherwise provide a receptacle long enough, broad enough, and deep enough, and label it as the "Limbo" of Milton, or with the more prosaic announcement "rubbish shot here."

SINGULAR CAUSE OF FAILURE.

Since writing the remarks in the preceding article, we have received from Mr. **Ackland** some singular details of the development of part of his plates exposed at Epping during the South London Meeting on Saturday. Out of fourteen plates exposed, Mr. Ackland has developed eight. These consist of plates prepared by Fothergill process, the collodio-albumen, and the Petschler and Mann modification. When the first plate was developed, immediately on application of the pyrogallic acid, it turned red, completely fogged. A second was tried, with the same result; a third and a fourth, and so on until eight had been developed. Fothergill, Taupenot, and Petschler and Mann, all fogged with the most systematic impartiality. Each plate apparently contained a good image under the film of reduced silver which obscured it. As Mr. Ackland had never met with a similar failure, he commenced carefully to seek for the cause, which was fortunately more obvious than such failures often are. These plates are prepared in a small laboratory recently built in the garden attached to his residence. Ventilation had been provided for by leaving a space for the admission of air at the bottom of the erection. This, during Mr. Ackland's recent Alpine tour, had attracted the gardener's attention as unsightly, and he had neatly arranged the garden sweepings, gravel, &c., in the space at the bottom of walls, so as to fill it up. The decomposition of the vegetable matter here contained, had generated an amount of foul air, which as effectually produced fogging on the plates prepared during its presence, as if a bottle of the strongest ammonia had stood open during the process. It was a fortunate circumstance that several processes were tried; had the plates been prepared by one only, and that one still under trial, as Petschler and Mann's, the process itself, especially in the hands of a less scientific experimentalist, would probably have been condemned.

ON *LATENT* AND *APPARENT* PHOTOGRAPHIC IMAGES, AND THE RELATIVE USEFULNESS OF IODIDE AND CHLORIDE OF SILVER IN PRODUCING THEM.

By C. Jabez Hughes.

The earliest photographic fact on record is the blackening of chloride of silver, (the alchemist's *luna cornua)* by the agency of light. Though Scheele and Count Rumford experimented on this substance, Wedgwood and Sir Humphrey Davy were the first to use it for pictorial purposes. They abandoned their pursuits, however, from their inability to fix their pictures.* In making their experiments these philosophers were enabled to judge of their effect by their images being *apparent* and formed under their eyes; but subsequent discoverers, Niepce, Rev. J. B. Reade, Fox Talbot, Daguerre, and Archer, disclosed a more subtle action of light when they established that *latent* images, equally perfect were produced in a much briefer period of time, needing only the proper chemical reagents to make them evident. Into these two classes, *latent* and *apparent*, all photographic images may be primarily divided.

Chloride of silver is the substance generally used for producing *apparent* images, as in sun-printing, and it is a curious fact that it was the first material used for the purpose, and is retained to this hour for the same use. For *latent* images iodide of silver is always employed, and whether it be Daguerreotype, calotype, albumen, wax-paper, collodion, or any other modification, iodide of silver is always the base to act upon. Though by common consent these two salts are admitted as best adapted for the ends, yet amid the myriads of experiments recorded, I have never read any in which these salts have been tested as to their severally being best adapted for these two purposes.

In the course of some recent investigations in negative paper processes I was induced to test, for my own satisfaction, whether the iodide of silver was the best adapted for *latent* and the chloride for *apparent* images. With this view I made the following experiments, and as they were very conclusive I am induced to publish them, not doubting but that they are well known to many, but not knowing them to be recorded in a similar exact manner.

Experiment A.—I floated two sheets of paper, one on a solution of five grains iodide potassium, the other five grains of chloride of ammonium; when dry I sensitized them on a 40-grain nitrate of silver bath. When surface dry I exposed them each at the same time to bright sunshine. In a very few seconds the papers changed colour, the iodide from a pale yellow to a delicate drab, and the chloride from a white to slate colour, but the rapidity with which they changed was very marked, for during 60 seconds the iodide turned only to a light drab, the chloride deepened to slaty black. Though the exposure was continued much longer, the iodide only became an olive drab, while the chloride changed to a bronzed black. The superiority of the chloride over the iodide in rapidity of change and depth of colour was very manifest.

Experiment B.—Two pieces of paper similarly prepared and sensitized were next exposed to sunshine, under a very transparent negative, for one second only, and then taken into the dark room. Not a trace of an image could be detected on either papers, but on immersing in a dish of saturated gallic acid solution an image was apparent in a few minutes on the iodized paper, which speedily changed into a very fair picture, while on the chloride paper not a vestige could be seen, the paper retaining its original whiteness for half an hour. As the former experiment established the superiority of the chloride of silver over the iodide for an *apparent* image, so did this prove the advantage of the iodide over the chloride for a *latent* one.

Having satisfied myself that the forte of the iodide was in latent and the chloride in apparent pictures, I next tried how far they would assist or interfere with each other in their special vocations.

Experiment C.—A portion of the paper containing the chloride of ammonium I floated over the iodide of potassium solution, and when dry sensitized it and some plain chloride paper on the silver solution. When surface dry the two papers were exposed to sunshine as in experiment A. The plain chloride of silver darkened as rapidly as before, whilst the io-chloride paper scarcely changed from its yellow tint, and when the chloride was black, had changed only to a dirty drab. This experiment showed that not only did the iodide not assist, but actually retarded, if not deprived, the chloride of its property of rapidly darkening.

Experiment D.—Two more papers were prepared, one with plain iodide of silver, the other with the io-chloride; they were equally exposed for a second under the thin negative used in experiment B, and developed in gallic acid. In this instance both the papers shewed pictures, and though the plain iodide turned the deepest colour, indicating more sensitivenes, yet the io-chloride was nearly as deep, and during development kept the whites sharper and cleaner.

The above experiments shew that for apparent images the chloride is much superior to the iodide, and that the addition of the latter not only does no good but serious harm. On the other hand, the iodide is much superior to the chloride for receiving latent images, but the addition of the latter, while it slightly checks the rapidity, not only does not materially impair the functions of the iodide, but sometimes may be added with advantage. The above results are interesting as strongly confirming general photographic practice, namely, of employing mainly the iodides where *latent* images and chlorides where *apparent* ones are required.

Similar experiments will be mentioned on another occasion, shewing the part the bromide of silver plays, as an auxiliary or retarding agent, in the production of latent and apparent pictures.

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* In this difficulty we may heartily sympathise with these early photographers, for it is by no means clear that we are quite rid of the trouble yet.

SCIENTIFIC GOSSIP.

Some interesting details respecting the observations which were made on the occasion of the great solar eclipse in North America have recently reached us. Our readers are doubtless aware, that although Spain was the most accessible place for English *savans* to go to for the purpose of observing the phenomena accompanying totality, yet the moon's shadow passed over great part of North America, and consequently to our transatlantic brethren a journey to the north would enable them to obtain as good a view of the sublime spectacle as a trip to Spain would have given. An expedition was in fact organised by the United States Coast Survey to proceed to Labrador, under the superintendence of Professor Alexander and a competent staff of assistants, photographic and otherwise. This expedition has just returned to the United States, and from a report of the proceedings of the Scientific Association at Newport we glean the following interesting particulars. The expedition on nearing the line of central eclipse, met with an unbroken chain of mountains, having the appearance of cast iron, apparently beyond the limits of arborescent vegetation, and having patches of snow still lingering on their eastern side. This occasioned a great impenetrable mist all along the edge of the mountain chain, which every now and then rolled down and covered the plain on which they had at first decided to take their stand. It therefore became evident that that mountain chain must be interposed between them and the ocean, or the mist would in all probability roll down and obscure the sky just at the critical moment. After some difficulty, and no little danger to the photographic apparatus in crossing one of the mountains, the astronomers finally arrived on a flat terrace on the mountain chain, beyond and above the mist; here they decided upon finally placing themselves, and at once allotted to each person the part he was to take in the observations. A formal council was called, in which everything thought necessary should be done was talked over, and each person instructed by drawings and rehearsals in the part which he was to take in recording the phenomena allotted to him, so that at the critical moment he should not have his attention taken up by anything else. The strictest silence was also enjoined, no one being allowed to speak except the timekeepers until everything had been observed. Unfortunately, the day proved unfavourable, nine-tenths of the sky being obscured with clouds; they however, succeeded in recording much that was valuable, and far more than was anticipated by the observers themselves when they saw the cloudy state of the sky. As the time of first contact approached they were all arranged in a line, Professor Alexander in the centre, and the photographer at his side, so as to communicate easily with all. The seconds were called aloud by one assistant from an accurate chronometer, and the passing minutes by another, so that if one failed the other could take it up, and thus avoid the possibility of getting the wrong minute. Another assistant was ready with note-book and pencil, to dot down the exact moment to a fraction of a second, when the professor or any other observer called out "time." The photographer also had his finger on a trigger, ready at a signal from the Professor to let go the catch and record the desired phenomena, whilst his assistants had the photographic apparatus so arranged as to keep him well supplied with a succession of sensitive plates. When the first faint contact of the moon's edge was visible on the sun, "time" was called out, the recording assistant dotted down the fraction of the second and minute, and the photographer let go the trigger and caught the little curve, and showed the ragged edge of the moon faithfully as it was thrown up in strong relief by the luminous disc behind it. Thus they went on fixing a photographic record at each gap that was met with in the passage of the clouds over the sun, until the time of totality arrived, when, unfortunately for them and for science, the sky became quite overcast, and they lost the whole of the magnificent solar phenomena then to be seen, with the exception of just a glance of a long white blade of light from the corona quivering out of a gap in the clouds. The description of the ocular aspects of the gradual disappearance of the solar disc is very striking. Through a film of cloud the beautiful and lessening crescent could be looked at with the naked eye, and as it narrowed and narrowed it became a bit of ragged silver wire, all the edges of it ragged, just as the edges of the cusps are ragged when the moon has passed the node. Those who looked without the dark glass saw the glorious luminary sinking away until it was lost, just like some intensely brilliant incandescent metal exposed to a white heat, and dropping away bit by bit until it was all gone. No further details are given of the photographic part of the expedition, so we are at present ignorant as to the process employed or the size of the image. Further particulars are, however, on the passage, and as soon as they arrive they shall be laid before our readers.

About two months ago we gave an account of the success which had attended Messrs. Spiller and Crookes in their eclipse photography at Woolwich. They have communicated a paper to this month's *Philosophical Magazine*, in which the details of the apparatus, process, and results are fully given for the benefit of the scientific world. The accounts do not differ in effect from those which we gave the week following the occurrence of the phenomenon. From all that we have since seen, the photographs taken by those gentlemen are the best records of the progress of our satellite over the solar disc which are in existence.

Mr. Wentworth L. Scott, whose name must be well known to the readers of this journal, has recently devised a very ingenious plan for mounting microscopic objects. He employs as cells, very thin discs of pure gutta-percha, with apertures cut in the centre of each the size of the interior of the cell required. The way to employ them is to warm the clean slide, lay the cell in the middle and dab it down with one finger all round, taking care not to soil the inner portion of glass. When cool place the object on, and cover it with thin glass the same size as the cell, warm it again and press firmly down with a cloth. Trim the edges if needed, and gum on each side of the slide a piece of paper a little larger than the cell, and label. It is of course evident that only some kinds of objects can be mounted in this manner, but for the proper kind it is difficult to conceive anything more simple or effectual.

In Professor Ansted's articles on Geology and Physica Geography in the *Chemical News*, treating of the subject of earthquakes, he gives the following cheering prospect for us inhabitants of the British Isles:—"And lastly what is our position with respect to the chances of earthquake disturbance? We live in an area certainly subject to such movements, and not very far from those countries where the most severe earthquakes on record have happened. Any part of this area of western Europe and its shores is as liable to a great occasional upheaval as it is certainly affected constantly by small ones. We enjoy no immunity. Earthquakes have frightened our forefathers, and may overwhelm us. The fatal explosion may happen this or next year; it may not happen in this century. It may originate beneath our very feet, or at the bottom of the ocean near our shores, or it may take place so far away that we hear only the faint distant echoes of the convulsive throe, but we are not the less certainly *living over a mine ready to be sprung*, and no one can tell when or where the fatal match will be applied." The above extract, taken in conjunction with the terribly abnormal influences which seem to be weighing down all meteorological phenomena, and with the remembrance of the earthquake (violent for these islands) which we felt a week or so ago on the east coast, certainly does not tend to cheer one's spirits.

We learn from Lille that a photographer on the part of Prince Albert has been recently taking photographs of the sketches of the old masters which are in the Wicar Collection. Considering the state in which these drawings are in, the operator has met with decided success. The yellow tone which pervaded some of them not having been so injurious to the photographic action as had been expected.

FROM A PHOTOGRAPHER'S COMMON-PLACE BOOK.[*]

Informing my cheery, bustling, busy, young landlady that I should not return to dine (the charming little jade smiled as if the information pleased her, though I really don't think I eat more than is usual upon such occasions), I started early one morning for Minster.

I had a companion on the road, a chance-met old friend, who (there is no probability of his seeing this) was one of the best-natured of honest-hearted little men. He was rather a melancholy individual in appearance, but he always endeavoured to be particularly cheerful and amusing, and as constantly succeeded—in plunging you into a very uncomfortable state: for by some mysterious process he had persuaded himself that he could not open his mouth without giving utterance to such whimsical and ludicrous remarks as immediately threw him into a fit of laughter, in which, of course, he expected you to join. Now, as he seldom, if ever, said anything that was at all comic, and as one can't—in emulation of a certain grey-bearded, old, London model, you may wot of, now no more—laugh heartily at nothing by the hour, why, his company was not exactly a thing to be desired.

It was a long time since we had met, and as we walked to the station I could, at first, laugh with him easily enough, for it was decidedly funny to see the odd little "party," with a cunning twinkle in his winking, small eye, laughing so boisterously without any perceptible reason for doing so; but by-and-bye this view of the matter became too familiar, and I had to force a laugh; my forced laugh soon degenerated into a spasmodic ha! ha! and even this grew fainter and more and more like a cough, so that I got into the train, and the low-spirited condition usually created by my friend's process, at about the same time. To make me more "blue" it began to rain.

Minster lies about five miles westward of Ramsgate, it is more pleasantly reached by road than rail, although as a question of time I chose the latter. You may hire open carriages in any number, by the day or hour, cheaply enough, *but*—I solemnly adjure you to look to the animal before you choose your vehicle. From the deep wells of my experience comes this truth—*there are* animals "averse to speed," beyond the reach of kindness, correction, or temptation; who are willing to become martyrs, if you like, but who won't change their faith in that dusty old apothegm about "slow and sure." Beware!

The rain had ceased, and the sun shone out again when we got from the train, and at once found ourselves opposite that fine old relic of our great creed's happy advent, Minster Church.[†]

It is said to be the oldest church in England,[‡] and it stands upon ground which was first consecrated to the divine mission of Christianity and trodden by the feet of its earliest apostles.

In this building, however, there is little remaining of the ancient venerable church. The bigot wrath of the strong-handed old Puritans tore down the antique images which once decorated its exterior, and removed its crosses and relics.[§] Neglect and bad taste have done the rest. The old steeple is gone; very modern windows are in the place of their aged predecessors, and their old mullions too are absent; the roof is modern; the mean, ugly, wooden porch as devoid of the picturesque as it is of any pretensions beyond those of a mere farm shed—is of recent date; in short, of the exterior, little beyond the dilapidated tower can be considered as part of the original edifice.

For the interior of the building much has been done by the excellent taste and personal liberality of one of its vicars, the Reverend F. V. Lockwood; the nave is its most ancient and best preserved portion. The short massive pillars and circular arches, built "according to the plainness and simplicity of those times," are almost entirely devoid of ornament. The roof was at first, evidently, very low and unpretending in its character, but it was afterwards raised by the erection of a wall over the arches. Several old grave stones and tombs of great antiquity exist herein. There are a number of musty monkish legends pertaining to this church, the locality, and the wealthy nunnery formerly connected with it, which latter was burnt down by one of those terrible sea kings, (supposed to have been the father of our king Canute,) upon which occasion the unfortunate nuns were driven out and scattered abroad, while their property was greedily siezed by those fierce old piratical marauders.

I could not help thinking in what a superior state of preservation Minster Church ought to be; so strongly associated as it is with the earlier history of our religion. This spot is our Mecca—for here is the birth-place of our creed. And truly it is a sad thing to see these precious memories of dear old England's time of infancy and childhood sinking through neglect into oblivion; haunted too, as they are, by the spirits of those who struggled against fearful odds for the right of sowing seed, to which we owe that political and religious freedom whose ripening fruit we now so proudly recognize. I plead for no idle memories in making these humble remarks, for such mementoes cannot be lost with impunity.

What should be said of one who, scorning all those recollections which " foster the heart they tend," erased from the tablet of his mind the sweet traces of dawning feelings and sentiments—the fresh young heart's best, purest and truest poetry; spurned away from him the paltry little toys, once so treasured and loved—forgetting how they were then more precious to him than anything should ever be again; shut out the earnest innocent and unselfish loves and friendships of his boyhood's days for the hollow mockeries which wisdom opens to the eye of manhood; and so, poor fool, resolved to live only in the narrow little bounds of his present experience?

Whatever might be said of such a soulless and heartless piece of human machinery may be said of such a nation. Just as the one would become cold, hard, selfish and contemptible, so would the other!

Some *may* ask "what has all this to do with photography?" Only this, that to none more than to photographers can be traced the power of keeping these powerful memories fresh and green within the nation's heart.

Upon my word, when photographing this lowly edifice, I felt that the task had something noble in it, and set to work with increased zest and pleasure. Perhaps my remarks may give a fresh significance to some of your own productions: perhaps, also, they may call the attention of a more able professional photographer than myself[*] to this antique relic, a photograph of which has not yet, I think, been published. If so I should be pleased. In consequence of the tall trees which so closely shut in the church, I had to procure my view from the gateway—by no means the best spot for the purpose. We afterwards took the road beside the rail, with which it runs almost parallel, and had not gone far before I came to the "face about," called a "halt," and "pitched my tent," telling my friend to get the camera ready again.

"Camera, try-pod," said he, and immediately shook with laughter.

Stationing the camera, with its one big eye, towards Minster Church, I obtained a very good subject. Its foreground contained, on the one side, rushes and weeds backed by a bush, on the other some tall, thin-trunked trees with picturesque curves in their lines and drooping foliage, overhanging the shallow water of a narrow little stream, its surface plentifully bespread with a goodly variety of water plants. Over this, by way of bridge, lay an old worm-eaten plank. (The water being in shadow and of a yellowish green colour, came out beautifully.) In the middle distance I got a charming, old, stumpy, ragged tree, almost a bush, which not only served to balance the composition (*see* Lake Price), but also to contrast the tall and tapering forms of the trees in my foreground. To complete the view I had a group of picturesque old cottages and the modern steeple of Minster's ancient tower, pointing upwards from its nest of green trees above the rustic wall of the churchyard.

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[*] Continued from p. 231.

[†] Anciently written *Mynstre*.

[‡] Local history has preserved the memory of one of these Puritan destroyers in the name of Richard Culmer, who, alone, by moonlight, got to the top of the steeple and removed the cross.

[§] With the exception, perhaps, of St. Martin's, at Canterbury.

[*] Although constantly and daily engaged in my capacity of artist in photographic portraiture, as a landscape photographer I am as yet in my novitiate, and the veriest amateur.

It strikes me I've got to the end of this stage, so must pull up my steeds, resign my whip, and descend from the box, till the fresh horses are ready to start again next week. Good bye. A. H. W.

(*To be continued.*)

PRINTING ON ALBUMENIZED PAPER AND TONING WITH THE ALKALINE GOLD BATH.

Scarcely a day elapses but we receive numerous complaints of the difficulty of producing vigourous prints and good tones by the alkaline gold toning process. In the printing frame, if the negative be good, the pictures appear all that can be desired; the lights are pure, the shadows deep, gradation perfect, detail sharp; in short, a vigourous and satisfactory print is produced. The same print, however, after toning and fixing is often too blue or too red in colour; is flat and wanting in vigour; looks, in fact, to use a Yankee's description of the result, as if "the toning had *whittled* off the corners of the image, destroying a certain amount of sharpness." We are induced, therefore, to lay before our readers the following brief statement of the printing and toning manipulations used by Mr. J. C. Leake, jun., printer to one of our first metropolitan photographic establishments. We do not offer them as possessing any feature of especial novelty, they are, on the contrary, merely an embodiment of the various formulæ that have from time to time been published in these pages. Their merit consists in the fact that they are attended with universal success. We are familiar with the results; and can assure our readers of their uniform excellence in vigour and richness of tone. The details are similar to those of our own practice, by which we have generally been able to get any tone from a warm purple brown to a deep black. We prefer to give them as stated by this gentleman, because of the guarantee to our readers afforded by the writer's production of some hundreds of perfect prints every week.

The Paper.—This should be good genuine saxe; each sheet should be examined and carefully selected free from metallic spots. The right side should be marked with a pencil at one corner; and if a very fine surface be required it should be sent to the hot-pressers to be rolled.

The albumen should be from fresh eggs, carefully separated from the yolk and germ. The proportions as follows:—

Albumen	15 ounces.
Water	5 ounces.
Chloride of Ammonium ...	300 grains.

Dissolve the chloride in the water first, and then add it to the albumen, and beat up with a bunch of quills for fifteen or twenty minutes. This solution should be allowed to stand three or four days, and the upper portion poured off for use in the following manner:—Pour the solution into a flat dish to the depth of half-an-inch, and draw off the scum with a strip of paper. The dish I use for the purpose consists of a sheet of plate glass cemented into the rabbet of a frame of wood; thus forming a dish with glass bottom and wooden edges. The advantage of the glass over porcelain consists in the fact, that when I work with sufficient light underneath the dish I can at once see if air bubbles are formed between the paper and the albumen, and easily remove them.

Now lay the smooth side of the paper down on the solution, carefully avoiding air-bubbles, as I have said, and allow it to remain for one minute; lift it by the corners, and dry at a moderate distance from the fire.

The Sensitizing Solution is as follows:—

Nitrate of silver	80 grains.
Distilled water	1 ounce.

Acetic acid, five drops to ten ounces of solution.

Float on this solution for five minutes, and dry as before at a short distance from the fire.

Upon removal from the pressure frame, the prints should be placed in a dish of water and thoroughly washed, to remove the free nitrate of silver. This water should be changed several times, and to the last a tablespoonful of common salt should be added, to convert any remaining nitrate of silver into chloride.

The prints are now ready for immersion in the following toning bath:—

Water	½ pint.
Chloride of gold	1 grain.
Carbonate of soda, about ...	5 grains.

The quantity of carbonate of soda is not of strict importance, so that a moderately alkaline reaction is insured, without being sufficient to disolve the size of the paper.

The prints are to be immersed in this solution, and be kept moving constantly to avoid air bubbles and consequent stains. When sufficiently toned, which will generally be in about three or four minutes, a little practice and judgment being necessary to determine the right point of colour, they are to be removed and well washed.

The Fixing Bath, in which they are next placed, is as follows:—

Hyposulphite of soda	6 ounces.
Water	1 pint.

The fixation will probably be complete in from five to ten minutes, to insure which, each proof should be kept moving as directed in the toning bath. It should then be held up to the light and examined; if there be no measly spots, and the print is evenly transparent, the operation is perfect. The fixing solution should not be used for more than two or three batches of prints.

The proof must now be well washed. To effect this place them in a flat dish, and give them at least a dozen changes of water under a tap, they may then be allowed to soak all night; then be well rinsed in cold, and finally in hot water, and then dried.

In printing by this process it is well to observe the following precautions:—

1st.—The nitrate of silver bath should never be allowed to fall below sixty grains to the ounce.

2nd.—The prints should not be immersed in the toning bath too many at one time.

3rd.—The sensitizing, printing, toning, and fixing, should be performed on the same day.

One grain of chloride of gold will tone about four pictures, nine by seven.

Proceedings of Societies.

South London Photographic Society.

The last of the open-air meetings of this Society, in which it had been resolved to combine practice with theory, and pleasure with profit, instead of adopting the usual vacation, was held on Saturday last, the 15th instant. This project, happy as it was in conception, has been, owing to the unprecedented inclemency of the season, comparatively inoperative; thus the last sylvan meeting of the season was really the first; the weather being on all previous occasions too suggestive of catarrhs, rheumatism, and other evils attendant on east winds, damp air, and wet grass, to tempt the majority of the members into the woods.

The meeting of Saturday was held in Epping Forest, the appointed trysting-place being "The Eagle," Snaresbrook, as we announced last week, at or about a quarter-past two, that being the time at which a train arrived from London. At that hour, and before and after, the members gradually assembled until somewhere near twenty were present, amongst whom was the Reverend President. The majority were prepared simply to look on, and others to use the pencil and sketching-block instead of the camera. The uncertainty of the weather, threatening showers having fallen during the morning, and the shortness of the working hours left at this autumnal season, had deterred all but the votaries of the various dry processes from bringing down their apparatus.

The first views were taken in the road by the railway station; others from spots further in the forest, taking the road past the sheet of water in front of "The Eagle."

Messrs. Tear and Ackland were trying experiments with Messrs. Petschler and Mann's discovery, and various other dry processes were duly represented; but the "wet" was only represented by the weather. The little army of photographers awakened no small curiosity in those who chanced to pass near; and there was no dearth of fun and laughter in the intervals between focussing and exposing. Some thirty or forty plates were in all exposed, but had the day been more positively fine, perhaps four or five times that number would have seen the light. Several short sharp showers fell—somebody said they had been preserved all the week for this occasion—and the afternoon soon, ah! too soon, grew gloomy and dark, so that it was a matter of general regret that an earlier hour had not been named for the meeting.

A few hours spent in rambling in and out of the forest glades; trying various views and "landscapes with figures," in which the various members present were grouped; indulging in

"Quips, and cranks, and wanton wiles,"

and discussing various matters photographic to which the circumstances gave rise, consumed the few hours of daylight, and the party adjourned to "The Eagle," where an excellent tea, accompanied by what the Yankees would call "fixins" of excellent ham and eggs was provided. We are almost afraid to detract from the dignity of what proved a most interesting and instructive meeting, by referring to the nicotian and other cognate processes which were experimented on during the evening.

Mr. Wall exhibited a beautiful little positive taken by Mr. Skaife with that gentleman's new "Pistolgraph." Some discussion, in which the President, Mr. Wharton Simpson, Mr. Hughes, and the Secretary took part, arose in reference to Mr. Skaife's invention, and some statements made by Sir David Brewster and others were incidentally brought forward as relative to an optical principle involved.

Mr. Davis exhibited a few specimens, one of which, a small vignette taken with one of the glasses of a telescope, was thought especially artistic and beautiful.

The Rev. Mr. Statham, the President, said he had been thinking over a matter which he desired to lay before the meeting. In the first, or one of the earlier numbers of the new German journal some hints were found as the advisability of publishing a general index of reference, by which photographic students might see at a glance what had been said or done in reference to any one subject, process, or other matter in connection with the art. The special utility of such a work would be at once apparent to photographers, inasmuch as articles of value on the various branches and theories were so scattered, and the journals and magazines in which they were to be found were so numerous, and of so varied a character, that many valuable matters must necessarily lose much of their utility, and finally become lost altogether. Such a *Catalogue Raisonné*, as it might be termed, would be of infinite service to our own Society and to others. Photographic literature was now in its infancy, but it was rapidly growing; and that which was now practicable might in ten years time be out of the question. He, the President, thought the Society might take some steps in this direction; most or all of the societies had originated such works, and with reference to that of the Royal Geological Society he, as a member, could speak very highly indeed of its great importance and utility. Undigested knowledge in scattered morsels could not compare in power with knowledge properly systematised, arranged, and concentrated.

Mr. Wall warmly advocated the adoption of such a system, but feared it was a task of greater difficulty than it might appear. To compile such a work would demand no little time, labour, and expense. Now the South London Society was very young, its exchequer very low, and the tasks already undertaken were, at present considering the means in hand, quite enough to occupy its time and attention. But, as Secretary, he would willingly try to aid in carrying out such a suggestion in any way he could. Perhaps, if he found it necessary, he might ask the members to elect another Secretary, with whose cooperation and assistance it might be accomplished, not in reference to the past but the future. He, Mr. Wall, would also suggest that a combination of subscribers from amongst the members of kindred associations might take up such a design by appointing a committee of their number for its management, and ensuring some respectable publisher against loss by its publication. He believed such a book would command a large and ready sale.

Mr. Hughes could easily see the difficulties of compiling a *Catalogue Raisonné* for the use of photographers, but was sure it would be a most invaluable boon to them. Such a work ought, in fact, to have been one of the earliest tasks undertaken by the parent society. If it was now difficult, when the science itself was so young, it would be impossible in the course of a few more years. Many valuable papers had appeared in various works, not photographic, such as *The Quarterly*, *The Chemist*, *Notes and Queries*, *Athenæum*, *The Times*, &c. Seeing Mr. G. Wharton Simpson present, and referring to him as representing the Photographic News, he threw out the suggestion to him as worthy of his editorial consideration.

Mr. G. Wharton Simpson fully acknowledged the value of the President's suggestion; but feared that to do it justice it was a matter too comprehensive and extended to come legitimately within the province of a journalist. He might mention, however, that he had had it in contemplation, in regard to the journal under his charge, to prepare a more complete and copious index to the existing volumes, and to keep up the system in future. He should aim to provide such a full and digested index as might in fact form a *Catalogue Raisonné* of the contents of the Photographic News, which he believed would prove a valuable and important contribution to photographic literature.

The President said there was another subject which had been touched upon in the Secretary's report, which he hoped would not be overlooked, viz.: that of forming a library of reference for the use of members. Copies of all important works were presented to the chartered societies, and doubtless such presentation copies would with equal liberality be forthcoming from photographic publishers or authors. The purposes with which the Society was organised gave it a fair claim to sympathy and support, and he did not think that claim would be neglected if an appeal should be made public.

Mr. Hughes: The question of a library was intimately connected with the consideration of a local home and librarian for the same. Such works as "Hardwich's Chemistry," "Sutton's Dictionary," Hunt's works, and those of many other standard authorities, *should* be in the possession of every society, undoubtedly; but he could see many difficulties in the way of establishing the thing, desirable as it was.

Mr. Wall said he would willingly undertake the duties of librarian until they grew too heavy for his shoulders.

Mr. Hughes said the books might be issued to members, and returned upon the nights of meeting. In that case, of course, they must be kept in the room where the meeting was held.

Mr. Wall said a box should be provided when the books were forthcoming, when

Mr. Davis said he should have much pleasure in presenting a copy of "Hunt's Researches on Light."

Mr. G. Wharton Simpson would also present copies of two little works: "The Photographic Teacher," and "Harmonious Colouring applied to Photographs." He would also place the name of the society on the list for presentation copies of the Photographic News.

Mr. Hughes, speaking to a suggestion of the President in reference to getting up an album of photographic celebrities, said it was an old saying that the shoemaker's wife was always ill shod, and its meaning held good with photographers, for while albums of all sorts of celebrities had been got up, we had yet to originate one devoted to photographic celebrities. Poor Archer had gone, and Daguerre, but many of the art's best friends still remained, labouring in the cause for which they had done so much. We still had Fox Talbot, with whose face few photographers were familiar, Sir John Herschel, Sir David Brewster, Professor Wheatstone, Claudet, Robert Hunt, Rev. J. B. Reade, Dr. Diamond, and many others. He would do his best to secure copies of portraits for such an album. He would initiate the movement by giving a portrait of Mr. Reade, from whom he had recently had a sitting.

Mr. J. A. Cotton, in behalf of his firm, would be glad to photograph any of our celebrities who would favour him with a sitting for this purpose. He had done very little for the society in any shape at present, but hoped to do more in future.

Mr. Wharton Simpson would present a print from his negative of Mr. Sutton.

Mr. Wall would provide a portrait of Mr. G. Shadbolt.

Mr. J. A. Cotton thought another album might be serviceable, *viz.*, one recording failures. It was very useful to *see* failures, and know to what they might be attributed. Some failures were of a very puzzling character, and by giving them a position in which they were always handy for reference, discoveries might be made of no little value to the photographic world.

Mr. Wharton Simpson said such an album would be of the greatest importance; but the failures should be fully and correctly described, with all the attendant circumstances, otherwise the collection would be positively disadvantageous, by making "confusion worse confounded."

Mr. Wall thought they should not be inserted in the aforesaid album until they had been laid before the meeting and discussed.

Mr. Hughes: And not then if any degree of certainty be arrived at in reference to mistakes or errors in the description given.

Several members pointed out in how many cases valuable results had arisen from supposed failures. Messrs. Petschler and Mann's discovery arose from a failure, and a long list of similar cases were instanced by Messrs. Herve, Hughes, Simpson, and others.

In the course of the evening another suggestion was thrown out relative to the advantage of procuring stereoscopic photographs of all the more valuable novelties in the way of apparatus.

Three new members were elected, Mr. Roberts, Mr. Holles, and Mr. Deberskey.

Thanks were very heartily awarded to the Chairman, on the motion of Mr. Hughes.

Mr. Wharton Simpson said they had been guilty of a sad omission at their annual meeting. Not only did this society owe its origin to their Secretary, but its present healthy position was mainly due to that gentleman's untiring energies and disinterested exertions in its behalf. After working hard twelve months for them, expending some money, more time, and still more thought and effort, he had not received even a vote of thanks. He therefore begged to move, as the nearest approach to an *amende honourable* they could make, that such thanks be now awarded.

Mr. Herve, having cordially seconded the motion—

A vote of thanks was then received by Mr. Wall, and the meeting shortly afterwards resumed its sitting in the railway carriage, passing over the sleepers as a wide-awake young society should, and progressing rapidly as we hope it may continue doing.

The following papers were announced for the next meeting, which will be held in the school-room beside St. Peter's Church gates, on the 18th of the present month:—

"*On the best mode of adapting Portrait Lenses to Landscape Photography.*" By Mr. C. Jabez Hughes.

"*On the Photogenic Action of Colour.*" By Mr. T. Clarke.

Manchester Photographic Society.

A meeting was held in the rooms of the Literary and Philosophical Society, 36 George Street, on Wednesday, the 5th inst., Professor Williamson presiding.

Mr. Isaac Horsfield, Mr. John H. Gilbert, and Mr. J. Kershaw were unanimously elected members of the Society.

The Hon. Secretary laid on the table a large collodio-albumen print, presented to the Society's portfolio by Mr. Joseph Sidebotham, also four large prints presented by Mr. H. Petschler, taken by his new modification of the collodio-albumen process, all of which were much admired, and elicited the thanks of the meeting.

After some remarks by the Chairman on the value of little picturesque bits of foreground to artists

Mr. Mabley said that the Society had no honours or decorations to bestow upon those members of the Society who had distinguished themselves by discoveries which they had made, and he thought, in the case of Mr. Petschler, it would be a very graceful and proper marking of their appreciation, if they were to elect him forthwith a member of the Council of the Society, there being a vacancy at present. He should therefore propose that Mr. Petschler be elected a member of the Council.

Mr. Sidebotham seconded the motion, which was carried by acclamation.

Mr. Mabley said that the editor of *The British Journal of Photography* had, in his article on Mr. Petschler's process, rather unfairly put the matter before the public. He there insinuated that the matter was only a variation of the Fothergill process; and, though he stated that he did not wish to depreciate the novelty of Mr. Petschler's discovery, yet he did at the same time try rather to detract from some of the merit which he (Mr. Mabley) thought Mr. Petschler was entitled to.

Mr. Sidebotham said he quite agreed with Mr. Mabley in his remarks, and thought the matter was not quite fairly put in the article which had appeared in the *Journal*. As important discoveries were really very rare in photography, it was only proper that the persons communicating them should have the full credit given them.

A general discussion then took place upon the subject of the new process, when it was suggested that some further experiments should be made in a systematic way before the next meeting.

Mr. Parry then read a paper *On the Action of the Aceto-Nitrate Bath in the Collodio-Albumen Process*, as follows:—

Some time ago, on preparing a few plates for printing transparencies by the collodio-albumen process, I accidentally removed part of the collodion film in the washing, after having sensitized in the ordinary thirty-grain silver bath. As the damage was but slight I completed the preparation of the plate in the usual way, and exposed it; but on developing I was much surprised to find I had little or no impression on the part from which the collodion had been removed, although the other portion of the plate developed in the usual manner.

I named this fact to several of my friends at the time, but paid no further attention to it then. Since, I resolved to make a few trials on this subject; for it would appear from the above that the only use of the aceto-nitrate bath is to coagulate the albumen, and if so, what is the maximum strength required for that purpose? The bath I had in use at that time was about fifty grains to the ounce of water: I therefore took half an ounce of it and added four and a half ounces of water, making it about five and a half grains to the ounce. I dipped one of the usual albumenised plates half way into the fifty grain bath, allowed it to remain the usual time, removed and washed that part only—first in a dish and afterwards under a tap, allowing it to drain a few minutes. I now dipped the other end of the plate into the five and a-half grain bath, washed as before, and allowed the plate to dry. Next morning I placed this plate in the pressure frame, under a good even negative, previously marking the end which had been dipped in the five and a-half grain aceto-nitrate bath. In developing I was not a little surprised to find the end I had marked came out first, and continued to do so, far outstripping the other in development.

I began to think I must have made some mistake, and resolved to try it over again. I now prepared an entire new aceto-nitrate bath, six grains to the ounce of water, and proceeded as in the first instance, marking the plate previous to dipping in the two baths. The result was precisely as before. Since then I have tried it in a great number of ways, but always with the same result. In my hands the weak bath has a greater tendency to blister, and the picture is on the surface, and not in the body of the film. This is remarkable, as the first experiment proves the picture to be at least on the collodion side of the film, if not in the body of the collodion alone.

I noticed, also, in two of my experimental plates, that at the junction of the two solutions the plate was quite insensitive to light, as may be seen on No. 2 and 3 [plates here produced]. But I did not succeed in repeating that on trial. It would thus appear that a much weaker bath will answer the purpose better than the one generally used. What may be the best strength I have not yet satisfied myself with by experiment; but have now reduced the one I have in use to twenty grains the ounce, and think I may reduce it still more.

After reading his communication, Mr. Parry exhibited several stereoscopic negatives, illustrative of the remarks in his paper, and a general discussion took place on the subject of the cause and means of preventing the blistering of the film in the collodio-albumen process.

Mr. **Griffiths** said it had occurred to him, though he had not yet tried it, that developing with alcohol instead of water, would prevent blisters.

Mr. **Neville** stated that he had long since tried the plan suggested by Mr. Griffiths, but could not at all succeed in obtaining any trace of a picture.

It was generally stated by Mr. Sidebotham, Mr. Mudd, and other members, that the best plan to avoid blisters was to bake the plate well previously to sensitizing the second time, and if the plates had been kept some time in the half prepared state, always to take the precaution of heating them again before sensitizing.

Mr. **Mudd** said he had lately sensitized some plates which had been kept some time. Some he warmed at the fire, before putting in the aceto-nitrate bath; but he did not take this precaution with all, and those only which he had not so dried blistered.

Mr. **Mabley** exhibited some negatives which he had lately taken at the seaside, on some of the plates lately prepared by Dr. Hill Norris, which were said to be as quick as wet collodion. The pictures he produced he had taken in from three to five seconds, and thought this fact was the most wonderful thing which had lately come out in relation to the dry processes. He also developed a plate which he had exposed for only a few seconds that morning at Blackpool.

The thanks of the meeting were given to Mr. Parry for his communication, and also to the Chairman for his services, when, after a very interesting meeting, the proceedings closed at a later hour than usual.

Liverpool Photographic Club.

A meeting of this Club was held at the residence of Mr. Forrest, on Tuesday, the 11th inst. There was a full attendance of members.

Mr. **Berry** exhibited a picture of one of the new street railway omnibuses, thickly clustered with passengers. This was taken with a view lens in the short space of five seconds. The portraits of a large number of the passengers were readily recognised by the several members. He also showed several proofs of negatives of the sun's disc during the late eclipse: these were about five inches square, and exceedingly clear.

Mr. **Helsby**, lately returned from South America, presented a very clear positive, half-plate size, that had been very successfully transferred to paper. After being blacked at the back with the usual asphalte varnish, the separation from the glass was accomplished by means of varnish of his own composition, which had the effect of making it adhere so closely to the paper that it left the glass without crack or break in the film.

Messrs. **Cook** laid before the meeting some very clear negatives, of stereoscopic size, prepared according to the method of Messrs. Petschler and Mann, and were disposed to think highly of the principle. The pictures were sharp, clear, and forcible.

Mr. **Corey** narrated the particulars of some very satisfactory experiments he has pursued on the subject of plates preserved with resin. Having tried them according to the plan recommended by Mr. Glover, at a recent meeting, but with indifferent success, he was about to lay it aside; but the lucid remarks of Mr. Hardwich, in the last edition of his work, caught his attention, where he observed that he advised, what had never been tried by any of the members, viz., redipping in the bath after exposure. This very judicious suggestion tempted another trial, and the result far exceeded his most sanguine expectations. There was no longer a cold, weak, spotted negative, but every part rushed out in full vigour and brilliancy. Nay, more, the same collodion that would produce a tame and medium picture, would now present one of the greatest intensity. But it must be observed that a slight washing was not efficacious for a clear picture, a large jug of water must be emptied on it with some force, so as to remove all trace of the free nitrate. These plates were ready to be snatched up at any moment upon the appearance of the genial beam, or the unexpected coming across a favourable object; but if no other recommendation offered itself, the time of exposure would supersede all others, for in every other description of washed plate a range of from five minutes to even twenty was requisite; whereas in no case had more than one minute with the sun, and three minutes without it been required.

Mr. **Berry** was also of opinion that the restoration of the free nitrate by dipping had some specific effect in the re-formation of the latent image, which could not be accomplished by mere mixing of the silver with the developer.

Mr. **Charles Jones** exhibited a very perfect negative by this method; but, not intending to redip, had exposed six minutes.

The Rev. **Thomas Banner**, during the meeting, developed two stereoscopic plates exposed that day, one of them by re-dipping, the other without. Though both were exposed the same time, that which was re-dipped exhibited every appearance of having been over-exposed; the other was rightly timed, but as it was a very light day the exposure was short in each case.

Mr. **Helsby** was disposed to think re-dipping exerted some occult influence, for he had tried forcing over-done positives, developed with iron, into negatives, by a further treatment with pyrogallic and acetic acids, but never successfully until he had heard of this; he then brought out rather deeply with iron, washed his plate, cleared with cyanide, and dried thoroughly. After this he dipped it again into the bath, and now upon applying the two acids as before, a very deep, clear, and intense negative came out.

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 19th September, 1860.

Paris is the fountain from whence all the vagaries of fashion flow, the centre to which all civilized nations look for the patterns and the models of the fig-leaves wherewith they clothe themselves. But the pace at which fashion travels is singularly varied and anomalous. For instance, it takes a longer time to cross the Channel than to traverse the wide expanse of the Atlantic Ocean. If you take the mail steamer to Canada, and make all speed to Quebec, Toronto, or Montreal, carrying with you the "last out" of the *Magazine of Fashions*, upon your arrival at those cities you will find the fashionables already clothed in the newest cut. They have received your *new* fashions a month ago, in "advance of the mail." But at London, although but a few hours distant, it takes from one to two years for a new Paris notion or fashion to obtain currency. It is two years since photographic visiting cards first made their appearance in Paris, where they soon obtained great favour and popularity. It was certainly one of the most ingenious and tasteful applications of our art to the conventions of society, which soon assumed an interest and importance altogether unexpected. It has afforded us the means and the opportunity of forming a co-temporary portrait gallery; and as the fashion has, here at least, become very general, and as these portrait cards are in most instances for sale, there are few notabilities whose photographic counterfeit we cannot obtain. This branch of photography rivals stereography in its industrial importance. The albums required to contain these cards are an important feature in this new industry, and give employment to a great many artisans.

Judging from what I have seen lately, I conclude that this branch of our art has just now taken a wide expansion in your metropolis. Portraits of the several members of the Royal Family, and of a host of persons distinguished in the ranks of British literature, science, art, and politics have found their way here, and awakened a vivid interest: hence, I infer, that the Paris fashion of *cartes de visite* is now substantially transplanted to London.

A quite unexpected result has attended the circulation of these miniature portraits—that of unmasking literary impostors. In the provinces especially, there are found knaves, who rejoicing in the same name as some popular author, assume his individuality, and put publishers under contribution for books for review, &c., which, of course, are never employed for that purpose. Such acts greatly compromise the character of the real Simon Pure, and in many instances have led to unpleasant consequences to the injured author. The circulation of these portraits will effectually put a stop to this evil.

The ideas entertained by Herschel and Arago on the physical constitution of the sun, are combated by M. Lenglet, who states, that all the observations made on the late eclipse of the sun tend to confirm the ideas he published in 1837 on the spots and other appearances observed on the surface of the sun, which are confirmed by the conclusions of M. Le Verrier.

M. Le Verrier believes that the sun is not a luminous body, simply on account of its high temperature. The sun thus formed of a central solid or liquid body, surrounded by an atmosphere, conforms to the common law of the constitution of celestial bodies. Observation proves also that this rose-coloured material sometimes accumulates in very considerable quantities upon certain points; and as the light of the corresponding part of the sun may be found more or less extinguished, we arrive at a natural explanation of the existence of spots on the surface of this planet.

M. Le Verrier attributes the spots to solar clouds; and that the rose-coloured protuberances are only clouds. M. Lespiault, of Bordeaux, saw a real *cloud* of fire, completely *isolated* from the obscure disc; and other observers of the eclipse have also seen these solar clouds.

Signor Volpicelli, of Rome, has published a description of a stereoscope, invented and exhibited by him in 1854; to which he gives the name of *diaphragmatic*. This instrument is very simple in construction, being without lenses or mirror; it consists of a horizontal rectangular box; the proportions of which are, height, 4½ inches, breadth 8 inches, and length 24½ inches. The stereoscopic views are placed against the vertical face of the bottom; two holes are pierced in the anterior vertical face, opposite the two centres of the views. Round the two axes, coincident with the vertical faces of the box, two rectangular plates of wood or blackened cardboard turn, of exactly of the same height as the images, and about 8 inches in length, serving to intercept the rays proceeding from the two views, so that the right eye can only see the left picture. The result is, that the rays proceeding from the two views, before arriving at the eye, cross and intersect at a certain spot nearly in the centre of the box; and it is at this spot that, after a slight effort, and giving a proper inclination to the diaphragms, that the eyes perceive the image in relief.

If, after seeing the relief, we turn the diaphragms round on their axis or hinge, so that they are supported by the lateral sides of the box, and no longer intercept it, continuing at the same time to regard the image in relief, we shall witness a very interesting phenomenon; namely, we shall see simultaneously, besides the image in relief, its two corresponding projections, or the two views coupled; or we shall see three images at the same time, one at about the middle of the length of the stereoscope which gives a sensation of relief, and two at the bottom, and that, even by an effort of the will, we cannot succeed in seeing two images, those of the projections only. These three images appear without the aid of lenses, mirrors or diaphragms, because after the diaphragms have served to produce the sensation of apparent relief, and they have been turned down, this sensation continues, at the same time it produces the sensation of the two other images.

The co-existence of these three images is a very singular phenomenon in a physiological point of view, as in a view of that kind, the eye receives rays which do not intersect, from those which in intersecting constitute the apparent relief, and the eye sees at the same time distinct images of every point from whence these same rays proceed.

If the two projections, or stereoscopic views are of complementary colours, the image in relief appears white, as in other stereoscopes, with this additional peculiarity, that after obtaining the sensation of the image in relief, and turning down the diaphragms without losing sight of the view, we see three images at the same time, one white, in relief, and two others in complementary colours, which are the images of the corresponding projections; this difference of colour also adds piquancy to the physiological phenomenon. Those who are not accustomed to the observation of optical phenomena will require some practice when they first attempt to percieve the sensation of relief with this stereoscope. But those whose eyes are of good conformation, and who concentrate their attention on the subject, very quickly perceive the object in relief, in looking along the middle of the length of the stereoscope. And when they have once succeeded in seeing it, it can be perceived at will without any difficulty.

It is difficult to explain the construction of this stereoscope without the aid of diagrams, but I hope the explanation given above will enable the intelligent photographer to recognize the principle upon which it is based.

During the recent excavations at Memphis, under the direction of M. Mariette, there have been found a metal founder's workshop, with about twenty kilogrammes of crude silver, gold ear-rings, and some twenty unknown silver coins.

Dr. Lallemand, making further researches upon the mode of action on the human organism of alcohol, and on the anæsthetic agents ether, chloroform, and amylene on the one part, and carbonic acid, and oxide of carbon on the other, comes to the following conclusions:—1. That alcohol and the three anæsthesic agents act primarily, directly upon the nervous centres, where they accumulate; secondarily, indirectly upon the blood. 2. That on the contrary, the carbonic gases actdirectly, primarily on the sanguineous system; secondarily, indirectly, and consequently, from the alteration in the blood, upon the nervous system; so that asphyxia will only be a consequence, as it is in croup and diptheria: oxide of carbon, moreover, exercises a decomposing action on the globules of the blood.

STEREOSCOPIC EXCHANGE CLUB.

Freemantle, Southampton, Sept. 15, 1860.

Sir,—I believe the stereo exchanges have not generally given mutual satisfaction, and therefore a revision of the rules of the Exchange Club is essential to its prosperity; and I think some such plan as the following would ensure its future success.

1st. Let every member send to you for your report as to quality, a positive from each negative which he purposes to print for exchanges.

2nd. Classify the impressions thus forwarded to you as first class, scond class, third class and fourth class, (if advisable) for surely many worse than even fourth class productions have been issued by some of the members of the late club.

This I think would embrace every grade of proficiency, and encourage the weak without disgusting the strong, while it would restore confidence to the members, who, relying upon your judgment, would know beforehand what they would get in exchange.—I am, sir, yours obediently,

Louis D'Elboux.

[We give insertion to this suggestion in order to elicit the comments of our readers; we fear, however, the task our correspondent suggests will be rather an invidious one, for who will willingly acknowledge his productions as third or fourth rate? and who will not be offended at being so classified, especially since it so often happens that the least ability is accompanied with the most confidence? Some of our correspondents have not forwarded specimens of any kind with their names, but have simply stated that they have done so on some previous occasion; but all the specimens forwarded have possessed at least average merit, and where the photographic qualities have been a little below first class, then the selection of subject and picturesque character of the view has fully compensated. If all the pictures sent for exchange are equal to those forwarded to us we do not think that much dissatisfaction can arise. We cannot of course say that every negative intended to be printed from will be as good, as in the majority of instances we have received but single specimens.—Ed.]

Startling Announcement.

Fleet Street, Temple Bar, Thursday Afternoon.

Sir,—Will you kindly oblige me by the insertion in your valuable paper of the new chemical fact, that solution of shellac, and gum sandarach, in alcohol and ether containing a certain proportion of iodide, bromide, and lactate of silver combined with the iodide of iron, will give a beautiful opalescent film, not only sensitive to light, but developing itself. All that is necessary is to coat a plate with this preparation, and expose it in the camera for one or two seconds, and on withdrawing it from the dark slide a fully developed image is found on the plate. It is fixed with cyanide. No collodion, silver bath, or developing solution are necessary.

I write this brief account merely to establish my priority of invention.—I am, sir, yours &c., M. Harry Bellini.

[This note reaches us at the moment of publication. Our readers must take its statements *quantum valeat*. The writer has invited us to witness the process, when we will report.—Ed.]

Photographic Tourist.*

A FEW DAYS ON DARTMOOR.

Following the course of the river a short distance, we came on several of these hut circles, and wishing to obtain a photograph of some, so as also to include the windings of the river, I fixed the camera, and looked out for a good point of view. At the first glance there seemed a fair prospect of success, but after several trials I could not satisfy myself with the result, and so did not feel justified in "shooting off" one of my dozen dry plates. At the time I was not over anxious to secure a picture of the specimens before us, as they were not nearly so good as some near Rowbrook on the Dart, which I noticed in 1856, and as it was my intention to revisit that spot, I hoped to obtain something better than was to be got here. The weather, however, as will hereafter be seen, threw me entirely out of my reckoning, and it most unfortunately happened that I did not get a single photograph of hut circles during my trip.

Whilst the camera was fixed I explained to C— the use of the "stops," and to illustrate my remarks, placed a white pocket handkerchief on a rock near by, so that, although out of focus with the full aperture, a small stop brought it out "sharp." The handkerchief in all probability is there now, for as a matter of course I forgot to take it up on leaving.

A walk of about three miles over the downs, in a direction almost due north, brought ut to the summit of a tor called "The Puppers," from which a most extensive view is obtained. Far away in the extreme distance is the broad blue expanse of the English Channel, from Bolt Head at the extremity of Bigbury Bay, to Portland, in Dorset. Start Point, Berry Head, Tor Bay, and the extensive adjoining country could be distinctly seen. The river Teign being completely land-locked appeared like an inland lake, whilst villages and farms might be observed dotted about in every direction. Nearer to us the course of the Dart could be traced as it flows by Holne and Buckfastleigh, and away for Totness and Dartmouth. Directly in front rose Brent Hill, a prominent point running out into the lowlands, so that it can be seen from a vast distance round. The hills which rise on the right bank of the Avon, obstructed the view in a westerly direction, and alone prevented the eye from reaching as far as the Lizard Point in Cornwall. These hills are crowned with barrows, or, more properly, cairns; the nearest one, Eastern Whittabarrow, is said to be the largest on this part of the moor. At Peter's Cross, or Western Whittabarrow, a little further inland, a cottage was erected in the middle of the barrow some years since, and inhabited by persons engaged in collecting rushes used in the manufacture of candles. The other barrows are, three on Three Barrow Hill, and one at Knottybarrow, all somewhat nearer the Erme than the Avon.

The barrow or tumulus is a well-known primitive monumental mound, most probably erected over the body of some important personage, or to commemorate some particular event. We are told that the Roman soldiers were accustomed in such cases, each to bring a helmet full of earth to the tumulus; and thus some have supposed, that on Dartmoor, stones being plentiful, they would naturally be used instead of earth, and that each one of the community added one to the heap. If so the inhabitants must have been very numerous, for some of the cairns are more than three hundred yards in circumference, and generally about eight or ten in height. Some few have been opened in consequence of the stones being required for "uses," or from other causes; but I have not heard of anything being found within.

It was now getting near two o'clock in the afternoon, and as C., who had only purposed seeing me a short distance on my way, would not hear of going back, I determined slightly to alter my original plan so as to reach the village of Holne, distant from Brent some ten or twelve miles, and which route would be much better for him then retracing the steps we had taken. In accomplishing this we had to keep well up on Holne Bridge, a long tract of high downs running almost parallel to the Dart. On our way we noticed a moorman shaping one of the numerous granite blocks, which are scattered about in all directions, into an agricultural roller. The farmers in this manner procure many useful articles, such as troughs, gate pillars, &c., &c.

Before descending into the low country, allow me to give a very few particulars of this portion of Dartmoor. But short as these remarks will be, I must leave them for the next number. M. H.

(*To be continued.*)

Photographic Notes and Queries.

To Free Silver from Copper.

Sir.—I shall be very much obliged if you will tell me how, in making nitrate of silver from coin of the realm, all the copper is extracted, as I cannot succeed in getting rid of all of it. I dissolved silver, precipitated it with chloride of sodium, and washed the chloride of silver till water came off entirely free from the green tinge. I then dried the chloride and mixed it with double portion of carbonate of soda, and gave it to the (Sowar) goldsmith, who brought me the lump of silver, which I dissolved in nitric acid; copper was again present by the slightly green colour, which turned blue on addition of ammonia.

In England, where nitrate of silver is so cheap, of course it would be useless an amateur attempting to make his own; but in this country it is always dear (ten shillings the ounce), and often not to be had. I always make my own chloride of gold, and make it for about one-fourth the price it is sold for. The native gold-leaf is very pure indeed. Which is the best of the dry processes?

I hope I shall go to Simla this season, and hope to be able to send you some views, both stereoscopic and landscape. From April 15th to October 15th in the plains we can do nothing. Will you kindly tell me the best kind of stereoscopic camera for landscape (rocks, and trees, &c.) scenery. I inclose my card. Kureem Buksh.

[Our correspondent had not, we apprehend, sufficiently washed the chloride of silver to get rid of the nitrate of copper remaining in solution. There is, however, another method of separating the copper. Dissolve the alloyed silver in nitric acid, evaporate to dryness, and then heat carefully and uniformly in a glass or porcelain dish until it fuses, and the nitrate of silver is decomposed with intumescence; then keep the mass at the same temperature till it fuses tranquilly, no longer exhibiting a greenish cast, and a sample of it dissolved in water, filtered, and mixed with ammonia, no longer forms a blue solution. The management of the heat requires care; if it be too low, the nitrate of copper is not dissolved; and if too high, nitrate of silver is formed. The mass when cold is dissolved in water, the solution filtered from the oxide of copper, gently evaporated and left to crystallise.

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* Continued from p. 235.

It is difficult to say which is the best dry process. The Fothergill process is, we think, the most practised, although many prefer Dr. Hill Norris's or Taupenot's.

As to the best stereoscopic camera, by which we presume camera and lens is meant, we cannot undertake to decide. See Advertisements.—Ed.]

Transferring Positives to Paper.

Sir,—In the News of last week R. E. X. gave a form for transferring positives to paper. I tried the experiment and it did not answer; perhaps he would be kind enough to give the quantities of each ingredient, and perhaps you would oblige by inserting a good developing recipe for positives.—You will most oblige yours obediently, H. S.

[Perhaps our correspondent R. E. X. will supply the necessary details. The following will be found to give positives of excellent tone if the collodion and bath are in good order:

Protosulphate of Iron	15 grains
Acetic Acid (glacial)	15 minims
Nitric Acid	1 ,,
Water	1 ounce

Alcohol sufficient to make it flow freely. Ed.]

Nailstone Rectory, Hinckley, Leicestershire.

Sir,—Will you favour me by answering, through the medium of your valuable paper, the three following questions. 1. What toning process produces the best results? 2. Can you explain the reason of the nitrate of silver bath after sensitizing about forty albumenized papers getting spoiled, first removing the albumen from the paper in bubbles, and afterwards removing the whole of the albumen from the paper. 3. Will gum prepared with vinegar cause fading to mounted prints, if so, what is the best substance to use?—I remain, Sir, your obedient servant, N. C. Cann.

[1. The alkaline gold toning bath. See an article in the present number. 2. After exciting a number of sheets the bath becomes exhausted of its silver, and the solution is too weak to coagulate the albumen, which is consequently dissolved or removed by contact with it. The exciting bath *must* be kept to the full strength to produce good results. Use a silver meter to test its strength from time to time. 3. Gum so prepared will undoubtedly destroy the prints. If gum be used it should be made with boiling water, very thick, and used quite fresh. We prefer a paste of starch, somewhat thick, made with boiling water, and used fresh. —Ed.]

Value of Chloride of Silver.

Carlow, Ireland, 14th September, 1860.

Sir,—I have got about 9 or 10 ounces of well washed and dried chloride of silver. Perhaps you would kindly inform me how I can best dispose of it, or if it would be more advantageous for me to reduce it to the metallic state than to sell it for three shillings per ounce in chloride, the price I have been offered for it. The atomic weight of chloride of silver being 144, and that of silver 108, or as 12 to 9, it would follow, that 10 ounces of chloride ought to give me 7½ ounces of silver, which, at say 5*s.* 3*d.* per ounce, would come to £1 19*s.* 4*d.*, whilst the chloride at 3*s.* would be only £1 10*s.* Perhaps you would kindly say in your next number what is the easiest process for reducing it.—Yours very truly, M. M. D.

[M. M. D. Without question the amount of pure silver in your chloride is worth a little more than the amount you will receive from the refiner; but unless you are accustomed to such operations, it might answer your purpose better to sell the chloride than attempt to reduce it yourself, as there is always a little risk and waste. If you wish to attempt it add twice its weight of a mixture of equal parts of dry carbonate of potash and carbonate of soda, place in a crucible, and submit to the action of an intense heat. Your silver will be found at the bottom in a button.—Ed.]

Talk in the Studio.

Photographic Ink.—We last week referred to the report we received from a scientific photographer, stating that a trial of this ink proved satisfactory. In a private letter just received from an experimentalist of the highest ability, who, having tried it, forms a very low estimate of it, he describes it as "intensely acid; chiefly nitrate of silver," and the rest he believes to be "some other acid metallic nitrate, probably nitrate of uranium." We hope shortly to be able to make some experiments ourselves and report.

M. Joubert's Process of Permanent Printing. A Hint. —A correspondent, writing for information as to the probability of this beautiful process being made public, remarks, if it be not intended, that "photographers by subscription should endeavour to purchase the process, as it is a pity the benefit of its being permanent in its results should remain, as at present, buried." M. Joubert does not intend, we believe, to publish his process for two reasons; he wishes, in the first place, to experiment and further improve it; and in the next place to see some reasonable hope of re-imbursement for time and money expended in perfecting it. He does not intend, we believe, to patent it. As to our correspondent's hint, it was acted on once in regard to a carbon process, and most of the subscribers felt themselves victimized. We do not imagine they would be in this case; but they would scarcely risk it.

A good Idea.—An amateur, using the wax-paper process wishful to avoid encumbering himself with unnecessary luggage on a pleasure tour, forwards his exposed papers, through the post, to a friend at home, who develops them, and sends fresh supplies of excited paper.

"Children by an Instantaneous Process."—Such is the somewhat startling announcement over the window of a photographic establishment in Park Street, Bristol.

A Hint to Photographers.—The *Times*, in an eloquent description of the Falls of Montmorenci, where a huge sheet of water springs madly over a cliff a sheer depth of 300-ft., and plunging into an unfathomable abyss at its base, is never seen again, remarks, "it is a pity that these exquisite scenes of Canadian beauty are never painted, photographed, or printed,—are, in short, almost unknown by name to the world in general. If the falls of Montmorenci and their natural steps were in the United States, there would be pictures of them everywhere, a fine hotel in their immediate neighbourhood, and thousands going to visit them annually."

[Since writing the above we have had our attention called to a beautiful stereogram of these Falls, issued by the Stereoscopic Company.—Ed. P. N.]

The Frescoes in the Houses of Parliament.—Photographs are not the only class of pictures that fade, and that rapidly. Of the frescoes in the Houses of Parliament, the *Athenæum* remarks, "the whole series are on the road to ruin." Some are blistering, some are mildewed, in others the surface is chipping or peeling off, and in all the colours fading or absolutely vanishing. We do not remember whether they have been photographed; but it might be worth while to preserve some truthful record of them before they are entirely destroyed. Surely this is a subject for the attention of the South Kensington authorities; if for no one else.

To Correspondents.

⁂ Our Correspondents will aid us in our endeavours to solve their difficulties if they will in all cases state details of their operations when failures occur; and when referring to former articles in the NEWS giving the exact reference. Signatures, such as "Positive," "Subscriber," and others of a like nature, should be avoided, as it sometimes occurs that two correspondents make use of the same signature. Initials are generally best. Letters intended for the EDITOR should be addressed expressly to him.

W. B. H.—We have sent you a letter by post.

B. J. (Cheltenham), and several other correspondents write to inform us that they have sent specimens some time ago, in compliance with the requisitions of the EXCHANGE CLUB. We are placed in a dilemma in this matter. We can have no wish to exclude names of such gentlemen from the next list; but since *we* have seen no such specimens, we should have to resume the responsibility of guaranteeing the quality without any means of judging of their merits. This might often issue in injustice to other members. We must beg of our correspondents to save us from this dilemma by again complying with the rule which renders a specimen necessary. Those who desire their names to be inserted in the list to be published next or the following week, will be so good as to attend to this.

F. P. P.—Thank you. The sketch shall have our early attention, and will probably find a place when opportunity occurs.

A LADY PHOTOGRAPHER sends us a very charming little photograph possessing much merit in an artistic point of view. The *pose* is easy and natural, and the expression very pleasant. The defects to which you call attention are caused by a slight shrivelling or reticulation in the film. This most probably arises from the presence of too much water in the collodion; or in other words, the ether or alcohol used in its manufacture were not sufficiently highly rectified. There is no absolute remedy in that case but mixing it with a sample of collodion containing less water, or discarding it altogether. Taking care to let the fim set sufficiently before immersion in the silver bath, will often be found of service. The promised article on Woodward's Camera may be delayed somewhat owing to the difficulty which the season has presented in getting sunlight for satisfactory experiment. The subject will be kept under attention. We believe it is used with much success in America.

G. C.—Neither good glue nor good paste, when once thoroughly dry, would be much affected by damp, unless under a prolonged exposure to it. We have not tried the India rubber solution, but should think it likely to answer. We have not had an opportunity of trying the lenses you name; but have heard them highly spoken of. 2. Various makers use different lacquers. Gamboge and dragon's blood, in proportions, to produce the tint you desire, added to shellac varnish, will give you an excellent lacquer. 3. You have probably added a little too much nitric acid. The addition of oxide of silver will convert the excess of nitric acid into nitrate of silver. See answer to NITROS in our last.

C. J. STEWART.—Without further details we cannot possibly give a reason for your prints being "dark about the face." Probably your negatives are not sufficiently intense. If you forward a specimen we can give you a more precise opinion.

JOHN B. (Kentish Town.)—Bromo-iodized collodions will retain their sensitiveness for a much longer period than simply iodized collodions. We have frequently heard the same complaint made of both those you name. As they are simply iodized, the addition to either of them of about half-a-grain of a bromide to the ounce, would materially add to their keeping qualities, and give more half tone and clearer pictures. Bromide of cadmium is easily soluble, and may be added to the iodizer before it is mixed with the collodion. If the base of the iodide in the solution be potassium, probably a small portion of bromide of potassium may be formed and precipitated. That will not materially affect the result. Some operators, on adding a bromide to iodized collodion, prefer at the same time an equal amount of extra iodide. You will find for this purpose the iodides of cadmium or ammonium more soluble than that of potassium, and the iodizing solution is probably saturated with that salt. Let us know of your success.

H. S. WARD.—For portraiture the best negatives are produced by development with iron, and subsequent strengthening with pyrogallic acid. Expose about double the time you would for a positive, and develop with:—

Protosulphate of iron	10 grains.
Acetic acid (glacial)	15 minims.
Water	1 ounce.

Alcohol, sufficient to make the solution flow, must be added. Develope until the details are fully out, and then wash thoroughly. Now intensify with:—

Pyrogallic acid	2 grains.
Citric	1 grain.
Water	1 ounce.

After floating sufficient of this a few times backwards and forwards on the plates until there are no greasy lines, pour it back into the developing glass and add a few drops of a twenty grain solution of silver made for the purpose, not from the exciting bath. The intensity will begin to augment at once. Continue until the right strength is attained, and fix in a weak solution of cyanide or in hypo. In the latter case be especially careful to wash well. You will secure cleaner pictures and more half tone than with pyrogallic acid alone.

VITTOR.—A good quarter plate portrait lens will answer the purpose. The negative should be placed in a dark box which should be connected with the lens, so that no light can enter the camera except through the negative. The developer must depend on the process used. If the ordinary collodion process the usual pyrogallic acid developer will answer your purpose better than gallic acid. The addition of acetic acid will give you the image of brown tone; citric acid in the developer will give you a blue black tone. The transparencies can be toned in a bath of chloride of gold.

A GOOD WISHER.—The tin dishes coated with shellac varnish may do for your final washing, but for no other photographic purposes. Wood coated in the same way would be better. Common earthenware dishes for domestic purposes answer very well, where those made for photographic purposes are too expensive. Your suggestion for gatherings of amateurs shall receive consideration. We are obliged by your good wishes. The details of the "Photographic Distribution" to which you refer did not come under our personal attention; but we will enquire.

F. L. G.—Prints on albumenized paper are better suited for the purposes of the oil-painter than those of plain paper. They require properly sizing before commencing to colour.

GLASGUENSIS.—Further particulars respecting Professor Way's new light will be given in an early number. The battery power required would be at least fifty cells of Grove's, and the lamp in its present form would hardly be applicable for private establishments, both by reason of its expense and variableness. The thing is not yet sufficiently perfected to be brought before the general public, but we understand that when matured the new light will most likely be brought out by a company. When answering your former enquiry regarding the process of M. Joubert, we were at the moment thinking of one process whilst you referred to another. That gentleman is the inventor of two permanent processes—one on glass, in which the picture is burnt in—the other a carbon process on paper. On the former we have an article promised. The latter, at present, he wishes to preserve secret. We give your suggestion in another place.

M. P.—Freshly made starch answers the purpose admirably. 2. We are not in possession of the secret.

BOB.—Decolourising collodion does not restore its sensitiveness. The use of mercury for the purpose has been found injurious to the bath.

M. D. D.—See below.

SEVERAL articles in type, and some answers to correspondents, are compelled, from press of matter, to stand over until next week.

All Letters, Works for Review, and other Communications for the Editor, should be addressed to the Office, 32 PATERNOSTER ROW, LONDON.

Advertisements and Communications for the Publisher for the current number, to be addressed to the Office, 32 PATERNOSTER ROW, not later than 3 o'clock every Thursday. Post-Office Orders are to be made payable to Mr. THOMAS PIPER, at the Money-Order Office, St. Martin's-le-Grand.

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WHAT IS LIGHT?*

BY A. GAUDIN.

When the position of a body in the atmosphere is changed, the latter, in virtue of its elasticity, is compressed in front of the body and depressed behind it; and, mathematically speaking, this disturbance in the equilibrium of the mass of air pervades the entire atmosphere with the velocity of sound, but becomes weaker and weaker until the inertia of the matter to be displaced balances the force that set the body in motion. This phenomenon is very striking when we close the door of a room, for all the doors and windows of the room receive an impulsion at the same moment, an undulation of air is produced, but it is a single one; for a sound to be produced, that is to say, a musical sensation on the ear, there must be a great many repetitions of the undulation in a very short space of time. For this reason there are a great many sounds which the ear does not perceive, either because the undulations are too slow or too rapid, all such sounds are out of the scale of hearing, but they exist, nevertheless.

The same phenomena are produced by light; this is an undulation of the ether, but it differs from sound by the fluid which serves as its vehicle, by the rapidity of its propagation, and the excessive tenuity of its undulations.

On account of the exceeding minuteness of the luminous undulations, we may suppose, that they cannot, like sound, be engendered by the displacement of a tangible body. The simple displacement of the *molecules* or *atoms* of bodies is *apt to engender light*. And we can readily comprehend that it is only a molecular or atomic *vibration* which can accomplish the prodigious multiplicity of the luminous undulations in a unit of time. In fact, for a body to emit red rays, vibrations must emanate from this body to the prodigious number of two followed by fourteen ciphers (0) in a second of time; thus, at the temperature of red heat, the atoms or molecules of the body perform 200 billions of undulations in the millionth part of a second.

This agitation or vibration, prodigious as it is, is incapable of disturbing the equilibrium of photogenic substances. The action of the chemical rays requires a repetition twice as frequent in the same space of time; but the red rays, as Mr. Edmund Becquerel has shown, can continue the decomposition commenced by the violet or chemical rays.

Apart from electricity, light is generally engendered by the deflagration of bodies by combination, and almost always by combustion; that is, by the combination of simple bodies with each other.

It is important to notice this, because the luminous vibration seems as if it must be atomic rather than molecular; for, considering the commoner sources of light, we find them to be in the combustion of hydrogen, carbon, phosphorus and iron, or other combustible metals, with oxygen, to form binary compounds or oxides. During this deflagration the atoms gravitate about each other with incredible velocity, executing orbits around each other reciprocally, exactly like the celestial bodies, and by virtue of the same cause; only the velocity corresponds with the smallness of the orbits, and time almost disappears.

Gravitation is caused by the difference in percussion of the particles of the ether (vibrating under the total pressure of the universe,) in the surface of the atoms, and the orbits in their turn react upon the ether, by virtue of their planes, dimensions, and duration; hence results regular undulations winding through the planes of the orbits on both sides, and in spirals perpendicular to the orbits on both sides; these are the two kinds of luminous rays which play so important a part in the polarisation of light. Why does not light pass through metals as easily as through all other bodies? The reason is, I believe, that the so-called metal the so-called simple body, and especially the molecule of mercury in a state of vapour, contrary to all other bodies, is composed of *a single atom*. By analogy, therefore, metals have a mono-atomic molecule, and consequently the distance between these atoms will be a constant for each metal at a given temperature. In this case it is a thousand to one that the length of a luminous ray will be incompatible with this constant; while in bodies composed of polyatomic molecules, that is to say, of many atoms, the distances between the centres of the molecules being also a constant, these distances are unequal on account of the unequal axes of the molecular polyhedrons; besides the polyhedron molecule itself already presents a great variety of distances between these atoms, which leaves every latitude to the propagation of the luminous undulations.

With regard to combustion and light there is a very remarkable case upon which photography may some day throw light. When an oxy-hydrogen blowpipe is in operation, and no substance placed in its flame, no light is produced; a scarcely perceptible bluish flame only is apparent, but as soon as the jet encounters a refractory body, a dazzling light is emitted.

The question is, if this blue flame, which emits little or no light, gives out photogenic rays, as well as when it acts upon a refractory substance. The experiment is worth making, and I propose soon to try it.

I shall place the object to be photographed in proximity to the blow-pipe, and take two proofs with the same time of exposure; one with the simple jet, and the other when it plays upon a piece of lime. According to the theory, the same, or nearly the same effect will be obtained in each case: yet in the first case there is no apparent light, if it be not the extreme violet.

THE SEARCH AFTER DRY COLLODION.*

BY M. VERNIER, JUN.

In concluding our former article on dry collodion, we said that we would make known the cause of failure, and the means of avoiding it. This little duty we will now endeavour to perform.

We have said that collodion in drying loses its sensibility. But where does this sensibility lie. Is it not in the iodide of silver? But, then, does not the white opaline film of iodide of silver reveal its presence after the prepared plate is dried? Then the iodide of silver is not destroyed. Therefore, the sensibility should still exist. But there is an obstacle. What is it? Can we attribute it, as M. Gaudin does, to the free nitrate of silver. We have already expressed our opinion on this subject. Besides, the washing waters of themselves contain a small quantity of the salts, yet sufficient, as it appears to us, to perform the office assigned to them by M. Gaudin. It is not in this direction, we repeat, that we must search for the causes of non-success.

The obstacle, the only obstacle, is *gluten;* nothing but the gluten which envelopes everything, contains everything, which is spread everywhere; gluten, which, as M. Gaudin truly observes, is a kind of fatty body, which, once it becomes dried, is impermeable to water, and consequently impermeable to our photographic preparations, because these preparations consist of aqueous solutions. It is not merely a simple film which impedes our operations, but the whole mass of the coating, the porous vessels of which are dried from the centre to the surface. Now, we know the obstacle, to attenuate the resisting coating as much as possible, and to increase the latent sensibility of the silver iodide, the layer of collodion must be entirely converted into iodide of silver; this is one of the most important points of the question, of which the majority of photographers take no account whatever.

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* Continued from p. 233.

* Continued from p. 229.

If the layer of sensitive iodide were only superficial in the dry collodion, as in the wet process, we might obtain a picture; but what kind of picture? Weak, flat, without vigour, and for this reason quite unsuited for producing a good positive proof. That at once explains itself: the prepared layer is so thin, and the product decomposed by light so weak! Moreover,* it must be remarked, that the iodine, transformed into iodide of silver, greatly increases in volume, so that the layer of collodion thickens in consequence of this transformation. It results from this fact, that the ligaments of the collodion become distended, that the porous vessels become enlarged, that the fatty body diminishes, that at length the collodion enriching itself with sensitive materials, becomes adapted to the production of an excellent negative, black, vigorous, dense, more in relief, more harmonious, more artistic, in fact: because in that case the light accomplishes its task of decomposition with more freedom; since the reagents penetrate deeper into the general mass.

To arrive at this result requires a strong silver bath, a good collodion, and a good developing agent. The moment when the plate, coated with its chemical layer, is to be passed into the bath, must be well chosen. The Abbe Despratz, that skilful observer, whose interesting communications we regret to observe are so rare, has well understood all the importance of it in his last letter. In fact, if the proper time for immersing the plate in the silver bath be allowed to pass, only the superficial portion of the iodized layer will be converted into silver iodide. This fact may be observed generally on the edges of the plate, where the opacity is less evident than at the centre. Lastly, the plate must be allowed to remain from four to six minutes in the silver bath, taking care to move it up and down to facilitate the absorption of the nitrate of silver, and to make the fatty body disappear as much as possible. Having made these explanations, we shall now proceed by directing an attack upon the gluten, the pellicle of which must certainly be very thin, for we have materially attenuated it by greatly augmenting the volume of the sensitive material—iodide of silver. We are now going to submit the collodion to a double reaction, or rather to a reactive operation.

Here we are again in complete opposition to M. Gaudin, who avoids every reaction. It is true, we can arrive at the same end by different routes, as we can solve a problem by different kinds of calculations.

Briefly, however, since we have entered upon reaction, let us follow reaction. To submit the collodion to a reactive course, we must first introduce into the intermediate washing bath a quantity of acid sufficient to neutralize the fatty body, to open the pores of the collodion, and prevent the veil of reduced silver from making its appearance. This operation concluded, that is to say, after the plates have been submitted to the action of the acid bath for fifteen minutes, they can be dried and exposed in the camera, and afterwards transferred to the silver bath,† as pointed out by M. Gaudin, then pour upon the plate, commencing at one corner, the developing solution,* to which alcohol and ether have been previously added, to facilitate the absorption of the impressed product, and to avoid streaks or lines. Now, the reactive operation is finished, the problem is resolved, for the image will appear at every point of the plate clear, vigorous, without spots or fog of reduced silver. If, however, the results are not so complete as described above, the cause may be attributed to the collodion, to its being pulverulent, and composed of equal quantities of alcohol and ether.

As may be seen, this method, which at first sight may appear very complicated, is in fact quite simple. It requires no new complications, and the manipulations are exactly the same as in other dry processes. It is only a little slower in practice; it requires but a little patience, and an exact conformity to the instructions given above, to succeed perfectly; for it is in following this method that we arrive at obtaining good results with cereoline, which we can now say, with every confidence performs no part in the manipulation.

Erratum in p. 229.—Line 13 from end of article on "The Search after Dry Collodion" read:—"slightly capillary structure of the collodion, *for the iodide or the iodine composing the sensitive material must be the only product introduced into the collodion;* it is it's essence, &c."

FROM A PHOTOGRAPHER'S COMMON-PLACE BOOK.†

Many other excellent selections might have been made from scenery in the immediate vicinity of the view last described, but in obedience to a demand from within we turned our steps towards a certain "New Inn," following the way pointed out by a sleepily curious boy who had sauntered up to look wonderingly at us and the camera.

Repassing the church and turning to the left into a narrow lane we came upon "such a duck" of a ruinous old shed, as a lady artist might call it, under which we were glad to seek shelter from a passing shower.

Taking the path across the cornfield we looked back and discovered that a very charming picture might be secured from that spot. I got it on the ground glass in no time. The cornfield came first, some cottages peering out here and there from a bower of green foliage next, a fine group of majestic elms stood near these, and beyond all was the church steeple aforesaid rising above the trees already introduced to your notice. The camera was placed somewhat to the left of the path, one leg of the tripod being in the corn.

Passing along I soon again came to a stand, somewhat to the annoyance of my impatient little companion, who said, "I'm *in* a hurry to hurry *in* the *Inn*," and of course shook with unresrainable merriment directly afterwards.

Before us was a picturesque, low-roofed little cottage with a pigstye not very much less than itself. I could lay my hand upon the moss of its thatched roof, and almost look into the ridiculously small latticed garret windows in the shadow of the overhanging thatch. Its patch of garden was neatly kept and in a thriving condition, its door-latch had a very hospitable expression, and the miniature outhouses about it gave to the lines of the composition a charming degree of variety and contrast. The accessories of foliage, rails, gate, weeds, path, &c., all combined to secure me a picture which I should now be sorry to lose. I gave it a quotation from Wordsworth—

> "It seemed the home of poverty and toil,
> Tho' not of want."

Getting into the road we turned to the right and so reached "The New Inn" of Minster. The village itself is full of choice bits, quaint little cottages and gable-ended old houses, standing in groups which seem to have been arranged with an especial view of forming pictures. Unfortunately, some of those dreadfully neat, angular dwellings with door and windows arranged in the "tit-tat-toe three jolly 'windows' all of a row" fashion have been seemingly picked out from the suburbs of London and dropped down here and there in this locality, to the just indignation—I should think—of the picturesque, dusky old buildings amongst which their clean-faced newness seems so thoroughly out of place. There is a neatness and cleanliness about the village which is very pleasing; the little gardens are all well cared for, and the cottage fronts are mostly ornamented with prettily trained woodbines and convolvulus. There are some very fine walnut trees here, well worth a plate also.

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* We succeed in the wet process upon a superficial layer, because the presence of free silver combined with the iodide of silver decomposed by light facilitates at the same time the appearance of the image.

† The returning of the plate to the silver bath is indispensable. This bath must contain one-twentieth of alcohol, and the plate must remain in it ten minutes at least, for the dry collodion requires time to dilate, imbibe, and become spongy.

* I employ protosulphate of iron as a developing agent, because it helps to fix the collodion upon the glass, and bears the addition of alcohol better.

† Continued from p. 245.

The "New Inn" has some garden grounds attached which deserve a visit, being laid out with no little skill and taste. We passed a very pleasant hour therein, enjoying the perfume, colours, and beauty of the flowers as much as we did the "creature-comforts," provided by the smiling, healthy-cheeked waitress. This house is about a quarter of a mile from the station. I can warmly praise the freshly picked fruit with which they provided us; but "beware of the ginger beer," says my friend.

Having got a few more negatives from the hedges, green lanes, fields and farm houses about Minster, we returned home, and my little companion insisted upon my visiting his apartments and supping with him. I yielded to the arrangement somewhat reluctantly, being tired.

"Bring up the supper tray," said he to the small girl-of-all-work, whose dirty little childish face looked inconceivably comical under the ample womanly cap which concealed her small head.

The supper things were laid; the child-woman servant had retired—

"Why here's only bread and cheese brought up," said he; "what have they done with the duck?"

The girl aforesaid, appearing to answer the bell, looked the little man full in the face, and in reply to his inquiry said gravely—

"The duck, sir; oh! if you please, the cat eat the duck, sir."

"The deuce she did! then bring up the pickled mack'rel."

"The mack'rel, sir; oh! if you please, missus eat the mack'rel, sir."

* * * * *

The next time I went out picture taking I resolved to visit Richborough, but missing the train, and not caring to wait for the next, I went on to Minster again, resolving to walk from there to the former place.

The day was gloriously fine, and as I took my way beside the river Stour, its merry wavelets leaping to catch the shower of flashing sun diamonds which fell from the bright blue sky mirrored in its depths, I felt as if London could hold me within its dusky bricks and mortar never more, and sat down now and then in the thick, tall grass, beautified and perfumed with wild flowers, with such a sense of happiness and pleasure glowing within as seemed to remove me out of this work-a-day world, of toil, anxiety, and care, into some brighter sphere far and far away; but then—whisper—I had one companion with me, and that one companion was not of the male sex.

* * * * *

These stars stand for certain passages in my Commonplace Book, which, being no business of yours, and by no means photographic, remain untranscribed.

* * * * *

She was afraid of the cows; she was sure they were bulls. And to comfort the dear little trembler, I hailed the folk at the old red ferry-house across the river, who sent a stout-armed, neatly-dressed, pretty-looking wench to pull us over by the aid of a chain, in a crazy old boat, and land us safely in a marshy desert of meadow land on the other side.

There was nothing worth photographing until we reached some large, old, wooden barns with their giant doors and thatched roofs thrown out against a background formed by mountain-like masses of quivering foliage. Some of these old barns are susceptible of very artistic treatment, having their thatched roofs projecting some distance over their walls, and a picturesque kind of pent-house roof over the doors, casting huge masses of shadow, and securing much breadth of effect.

Breadth of effect; ah! that's a very good text for another useful little bit of digression.

J. B. Payne says "breadth denotes largeness, space, vastness. Its operation is not limited to the size of the picture. Finish does not preclude or negligence secure it. Opening and liberalizing the mind, it would appear to lift a weight from the spirits." Sir Joshua Reynolds told the Academy students that "the highest finish was labour in vain unless at the same time there be preserved a breadth of light and shadow," and all our great painters in all times have said much the same thing. Remembering that "artists feel the reason of that of which the ignorant only feel the pleasure" (as Quintilian says), the precepts such have advanced should be carefully studied. To quote another recognized authority, "objects must not only appear to possess those properties adapted by nature for their purpose and protection, but also those qualities which have been found by the experience of the best masters productive of beauty; this renders it a source of gratification, and it is then said to be true to nature and art." I might increase this little paragraph of quotations until they swelled into a small volume, but hope the importance of the subject is already acknowledged.

Breadth, then, is obtained by securing such a view of your subject as gives the light and shade in separate masses, such as I have described as given by the particular formation of these barns. The masses should not be of equal size. The effect may be greatly heightened by a focus of light and dark in somewhat close proximity. I do not mean that the whole of the darkest portion of your one mass should be in direct contrast with the entire lighter portion of the other; but that two points only of extreme light and dark should be brought together, to secure an expression of vivacity and vigour. In a picture which has this quality of breadth, the light sky will melt tenderly into the distance; the distance in its turn blend harmoniously with objects upon a nearer plane, and these again will find no harshness or crudeness of contrast in the immediate foreground, although with all this beauty of arrangement and aerial truth, nothing like weakness or want of relief will be found in any of its parts. It is difficult to clearly explain this subject in a few words; but when you have once learned to recognize breadth in the productions of others you will *feel* it far more strongly than you or I shall ever reason upon it. Most writers on this subject think it essential to secure three chief lights in every picture, one in particular as the presiding or superior light, or, in other words, the focus of light, and the other two for the sake of union and harmony. These lights are usually so placed that they form, more or less perfectly, a triangle. The principal light will, as I have just said, derive fresh force and effect from contrast with a point or focus of extreme dark: its place should not be exactly in, but near, the centre, nor should the other minor lights be too near either extremity. This principle was evidently known to, and practised by, all the old masters whose works display breadth of chairoscuro, as we learn from Sir Joshua Reynolds, who put the matter to a practical test, when at Venice, by taking a leaf from his pocket-book and darkening every part of it in the same gradation of light and shade as existed in the picture he was examining; a few trials in this way sufficing to prove that such effects of breadth were not the fruit of either blind chance or unreasoning instinct. Your three lights should not be of the same size or shape,

This artists "rule of three" is no fanciful piece of invention, you recognize its importance at a glance, for it pleases your eye, even if you know nothing about art. Poor old Jack, the gardener, who would listen to all I have said without the most remote idea of its meaning, will, nevertheless, arrange two smaller beds of flowers, one on either side of a larger "to make them look well." Your servant-maid, Mary, fresh from a farm-house dairy, don't feel happy if with a principal ornament on the centre of her chimney-piece, she has not two minor ornaments to place on either side of it. The upholsterer hangs your pictures with an eye to this rule, whether he knows it or not; and you arrange your furniture with proper deference to it. The difference between the vulgar application of such principle and the artistic is simply that in the first the purpose is strikingly apparent, while in the other it is artfully concealed.

Breadth of effect is attained when—

"Round the full lights, the wandering shadows steal,
Then only justly spread when to the sight
A breadth of shade pursues a breadth of light."

With these hints—they are nothing more, remember—I've done, and promise you that I won't be guilty of another digression until next week. A. H. W.

(*To be continued.*)

SCIENTIFIC GOSSIP.

WE have received an important communication from Mr. Spiller on a subject which, although so frequently presented to the notice of our readers in the form of an advertisement, does not appear to have elicited that amount of attention and discussion which a matter of such general importance would seem to deserve. The subject is that of the preservation of sensitive paper fit for immediate use, in the pressure frame, and is one which, although most important, has never hitherto been brought within the reach of the generality of photographers. The contrivances patented in France and elsewhere are perfectly effectual for accomplishing the purpose, but relying as they do upon the deliquescent properties of chloride of calcium, enclosed in a tin case, the boxes could not fail to get out of order unless looked after with great care, whilst the chloride of calcium is far too powerful an agent for safe employment. We can testify from the experience of more than a year that Mr. Spiller's ingenious drying box answers perfectly, and we strongly recommend every photographer in the kingdom to at once increase his laboratory paraphernalia by such an indispensable article of furniture. Mr. Spiller writes as follows:—

"The question of the possibility of preserving paper in a condition ready for immediate use in the printing frame has for some time past afforded me a wide field for experimental inquiry, and in the course of an investigation into the circumstances opposing its preservation in this state I am led to conclude that the retention of water by the paper is mainly instrumental in causing the rapid deterioration of the sensitive surface; and in proof of the correctness of this opinion, it may be stated that by adopting more efficient means for thoroughly drying the sheets shortly after their preparation in the nitrate of silver bath, they will, if carefully stored away from the action of light and damp, remain unimpaired for a much longer period than is possible under ordinary circumstances.

"Water acts so powerfully as a vehicle in promoting chemical decomposition that its elimination must assuredly constitute the first step towards securing the permanent character so much desired. The metallic particles frequently apparent even in the best descriptions of photographic paper will, in the absence of moisture, have but a limited power of reducing the silver compounds around them; and the reciprocal action exerted between the several forms of organic matter and the free nitrate will not be manifested to the same extent: on these grounds then it must have been anticipated that the principal recommendations of the system of preservation now advocated, would consist in the greater freedom from brown discolouration, and in the diminished liability to contamination from the well-known circular spots due to the cause first mentioned.

"For the last twelve months I have been in the habit of employing ordinary quicklime as a desiccating agent, and applying it in the following manner:—A strong wooden chest was constructed to open at the top as usual, but divided into compartments by having a false bottom of wood perforated with numerous small holes cut with a 'centre-bit;' below this a drawer of almost one-fourth the capacity of the box was made to slide in at one end. This is intended to hold a supply of stone lime for the purpose of maintaining a dry atmosphere, whilst the upper receptacle or main portion of the chest is well fitted to receive the sensitized sheets after they have been air-dried by remaining suspended for an hour or two in the photographic laboratory. The whole of the interior of the box excepting the lime tray is painted with lamp black. The wood of which it is made is stout to resist warping, and although deal has withstood up to the present time, teak would doubtless have been better adapted to bear the somewhat unfavourable degree of dryness to which the wood is continually exposed. The box is tolerably air tight and raised a little from the floor by being made to rest on two battens: if required of larger dimensions it might conveniently run on castors. In use every precaution should be taken to avoid the ascent of the fine lime particles into the upper chamber, and to prevent their diffusion among the papers; and it must be remembered at the time of charging the lime tray that the pieces of stone- or quick-lime, will increase very considerably in bulk as they fall to powder and become slaked with the water absorbed. It will not be found necessary to renew the lime while any portion, however small, remains unslaked, and the dry hydrate itself has even a further power of absorbing water.

"Next in regard to the printing properties of the paper subjected to this treatment, I have to remark that its actual employment in the highest condition of dryness does not seem desirable, a slight loss of sensitiveness, and perhaps a little less vigour in the resulting proof being apparent as the consequence; but it is sufficient to expose the paper for a very few minutes to the atmosphere of the laboratory to enable it again to assume its ordinary hygroscopic condition. To meet this necessity I am in the habit of transferring the *over dried* sheets to one of the drawers beneath my working table a short time prior to their employment, and have never since the first trials found any inconvenience on this score. On the contrary I have had during the unfavourable weather of the past summer many opportunities of appreciating the advantages of this desiccating box, being thereby enabled to use the paper longer after its preparation than was formerly possible.

"It will be obvious that a slight modification in the construction of the wooden box would consist in the employment of a moveable false bottom, which could be lifted out, and allow of the substitution of an inner tray for containing the lime, instead of the drawer communicating externally. This arrangement would then readily permit of the conversion of an ordinary packing-case, and the lid would only require a deep rim on all sides to guard against the possibility of light entering and exerting a prejudicial action on the sensitive paper."

An enterprising Yankee has hit upon a bright idea, that of controlling the clouds in order to make it rain at will. With the view of obtaining this desideratum he has built a "rain tower," which novel structure is said to be thirty feet diameter at the base, which size it retains to the height of forty feet. To this height it contains four flues, each seven feet in diameter. The number of flues is then reduced to two which run up twenty feet higher, the top of the structure reaching an altitude of sixty feet. The *modus operandi* of causing rain to fall is as follows:—The flues are filled with dry pine wood which is set on fire, and which is kept burning until the desired effect is produced on the elements. His theory is that the great heat produced in the air above the tower will cause the clouds to concentrate over it, when plenty of rain will fall in that vicinity. What a blessing it is that after going to the great expense of trying the experiment the ingenious author found that it would not answer. What actions for damages we should be having here if such a power as this were ever to be in the hands of one individual. The crops of all one's neighbours deluged to gratify a whim of the possessor of a rain tower! Has the individual who first conceived the idea of such a tower never seen or heard of a blast furnace? In some districts of England there are a dozen or more towers but a short distance apart, larger than the dimensions above given, and vomiting forth fire and flame without intermission from one year's end to the other. If a big fire could ever make it rain, here we certainly might expect to see signs of such a result, but we are not aware that rain is more frequent in the neighbourhood of blast furnaces than elsewhere in England. We photographers should, at the present time, be better pleased to see an invention for making it *stop* raining at will.

THE POSITIVE COLLODION PROCESS.*

BY F. B. GAGE.

I left off in my last article by saying that if your customers seem to prefer a light picture you must not persuade them to take a dark one, as they would always be dissatisfied with it. The best way to cure them is to let them have their own way.

Five years ago I took six daguerreotypes of an old lady for her children. The first five impressions were very good pictures, but the sixth was one of those dark steel-gray tones so much sought after, but seldom obtained. The figure stood out almost as round and solid as a stereograph, and the whole thing was a perfect gem; but not one of the children would have it. It was "too dark." I took another and retained that for a specimen. During the past week (after five years) one of the daughters came and purchased the rejected picture. It was just right now, and she was surprised that she did not see it before. Her taste had grown up to my standard. The public taste must be allowed to grow up in the same way. If it is forced up it will become distorted.

It is important that the collodion be heavy enough to give a good film, but not containing so much cotton as to make it flow at all uneven or troublesome. For fixing, the cyanide of potassium or hyposulphite of soda may be used. If you are accustomed to ambrotyping, and have your chemicals in fine order, fresh hyposulphite of soda may be used, and very fine results obtained; but if there is much organic matter in the bath, the cyanide may give the purest whites. I have produced the best pictures with the hyposulphite fixing. When I make the pictures in my own gallery I use the hypo. When I trust to others the cyanide is generally used, merely because it works quicker, and does not require so much care to keep the chemicals in the best order. In developing a positive it frequently happens that the developing is washed off too soon, and the operator will feel satisfied that it would have been better to have developed it a little longer. This will be seen before he has commenced to fix it. If he has not washed it very thoroughly there will be enough silver still left in the film, and he can apply the developing, and bring it out to the desired point. This I have done very frequently, and saved thereby many valuable impressions. When the hyposulphite of soda is used it is well to immerse the developed picture in a weak solution of common salt (chloride of sodium) first, and then in the hypo. This converts all the free silver into chloride, and insures purer whites.

If you desire to get your bath out of order, just half clean your glass, and be a little slovenly in all the manipulations, and you will succeed. There is another way in which the bath can be got out of order, and that is by misusing melainotype plates. Very beautiful pictures are made on these melainotype plates, but they are sadly abused, and promise to be for a time longer. It is the manufacturers that abuse them. The assertion that iron plates do not injure the silver bath is too absurd for any one's belief. Any person knows what the result is when the nitric acid and iron come together. If iron did not injure the bath, why not have iron dishes to hold our solutions? Unless there had been a great deal of unblushing effrontery somewhere that assertion never would have been made. I can tell you how to get out of this dilemma, however, and keep the silver bath as pure as the apple of your eye, so that the melainotypes will produce much finer results than glass. In the first place prepare a solution as follows:—

Chloroform, 4 ounces. To this add four parts asphaltum, and one part of balsam of fir,* until a black varnish is made, as thick as will flow readily. Then pour a portion out into a small groove cut in a piece of wood. Take the melainotype plate between your thumb and forefinger, with the ball of the thumb resting on the middle of the front side of the plate, and the ball of the forefinger on the back side, exactly opposite.

Now immerse the downward edge into the groove of black varnish about one-sixteenth of an inch deep; lift it out. Your finger and thumb will now form an axle on which you must turn the plate until another edge comes downward. Continue this until all of the edges are coated. Now hang it up in the same way on spring clothes pins, the pins being strung on a line to receive them. A box of plates could be coated in a few minutes in this way. All of mine are so coated. There is no naked iron on such plates to destroy the purity of your bath. I have worked them for a year, and they work beautifully.

Four apprentices of mine, who had discarded the plates because they injured the bath, are now using them in this way without any difficulty. There is another difficulty that can be overcome by practising a little dodge that will save much trouble and vexation; when your plate is coated ready to immerse in the silver bath, coat it again in the same manner as at first. In this manner the collodion need be only thick enough for glass positives. It is very difficult to flow a thick collodion on the plate and prevent ridges; but two coatings can be made thick enough without trouble. If the black varnish coating on the edge should dissolve and run in with your varnish, the edge can be clipped off with your shears first. The black varnish recommended above can be used on collodion positives on glass. The balsam of fir renders it elastic enough to prevent cracking. The best mode is to flow it on the varnished film; the picture so backed can be copied much sharper than those backed with glass coated on the back. Pictures sealed with balsam of fir can seldom be copied as sharp as is desirable. This is caused by light between the image and the backing which confuses the image in the camera. Many persons have regretted having pictures of their friends sealed in this way, for this reason, that satisfactory copies can seldom be made afterwards. The melainotype is the best of all collodion positives for that purpose. A beautiful picture on an iron plate can be copied to produce other beautiful pictures with all the original sharpness. When the manufacturer shall produce plates with the edges entirely coated his customers will be willing to pay better and buy more. The plates will then be all that the most fastidious could desire. It will sometimes be found that it is very difficult to clean the malainotype plate with alcohol and ether, as directed by the manufacturer. Try some old collodion; pour a quantity on the surface of the plate, and clean it off with a soft linen towel, and you will probably succeed. It should be wiped off expeditiously lest it dry on, in which case it would be worse than nothing. Plates that have had an impression will receive a final cleaning in this way, and work perfectly. Melainotype plates that have received an impression and then become dry, can seldom be cleaned to produce a good picture. The impressioned plates should be kept under water until it is resolved either to finish or erase them.

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* Continued from p. 221.

* Known in this country as Canada Balsam.

Photographic Tourist.*

A FEW DAYS ON DARTMOOR.

The centre of this, the southern portion of Dartmoor, is an extensive monotonous table-land, giving birth to the rivers Plym, Spalm, Erme, and Avon. Among moormen it is famous for its swamps and bogs; in their language it is a "whisht old place." Scarcely a tor, even, is there, to break the dreary desolation that surrounds the pedestrian who ventures to cross it. Here it was that Childe of Plymstock, "the luckless hunter," according to a tradition of the moor, got benighted and perished from intense cold. The story goes that he killed and disembowelled his horse to shelter himself from the biting blasts; but at length he lost all hope of life in this world,

> "Yet one dear wish—one tender thought,
> Came o'er that hunter brave;
> To sleep at last in hallow'd ground,
> And find a Christian grave."

and so, using blood for ink, wrote his last will and testament in the form of the following couplet:—

> "The fyrste that fyndes and brings me to my grave,
> The lands of Plymstoke he shall have."

Now, the merry monks of Tavistock Abbey hearing of this, soon arrived at the conclusion that "whatever others might think of the rhyme, they found reason in it," as Mr. Bray observes, "and good reason too, that they should constitute themselves heirs of old Childe, and so set their wits and hands to work to give him as speedily as possible an honourable sepulchre. But as the heirship was thus left vague and open to competition, there were others who thought themselves quite as much, if not more, entitled to succeed than the friars, and these were the good people of Plymstock, in whose parish the lands in question had their standing; and though not invited to the funeral, yet out of respect to the old gentleman, or more probably to his acres, they not only determined to invite themselves, but to try how far club-law might settle the heirship in their favour; and so taking post at a certain bridge over which they conceived the corpse must of necessity be carried, they came to a resolution to arrest the body out of the hands of the holy men by force, if no better settlement of the matter could be effected.

"The friars, however, were men of peace, and had no mind, may be, to take up any weapon sharper than their own wits; since, as Dr. Fuller says, when speaking of this adventure, 'they must rise betimes, or rather not go to bed at all, that will overreach the monks in matter of profit,' for these cunning brothers, apprehensive of losing their precious relics, cast a slight bridge over the river at another place, and thus crossing with the corpse, they left the men of Plymstock the privilege of becoming, very sincerely, the chief mourners, whilst they interred old Childe in their own abbey church, and according to his last will took possession of his lands."†

The parishes bordering on the forest have generally a right of common over certain districts for grazing cattle and cutting turf. The famous Dartmoor ponies are mostly kept more to the north, but they may frequently be met with here. Dartmoor sheep are to be seen in every part of the forest during the mild season, but in winter they are driven into the lowlands, where these wild, freedom-loving little fellows give the poor farmers an immensity of trouble by breaking through almost every fence. The tough, sure-footed ponies are easily broken in; but retain the pony's pluck, and spirit, and tricks, as long as they live. They are, however, surpassed by the Exmoors.

Leaving the forest bounds, for a time, we reached the little village of Holne, without meeting with anything worthy of note, and made our way to the churchyard, in which stands a venerable old yew tree, still alive, but evidently fast decaying. On its trunk "posters" of sales by auction, &c., were placed side by side with parish notices. The church itself calls for no particular remark; it is neatly simple in its construction, as most of the churches in Devon are.

At *the* inn we found a large assemblage of farmers, met together in consequence of a "survey," or sale, of a neighbouring farmer's stock. An event of this kind will always draw every one from within a moderate circuit. Some come to see how "things go," some to buy, and all to have a gossip about the times and a grumble about the weather. Furthermore, there is the inducement of cold beef, hot potatoes, cider, and grog, before the sale commences, open to all comers. The more the liquids are imbibed, the "livelier" becomes the bidding. I have heard of an auction at which the quantity of gin consumed was enormous. Boiling spirit was served up instead of hot water, so that even the inveterate topers got "more than they could carry." Farm stock made a good price at that sale. But fortunately these scenes are not so frequent now as in "the good old times," and it is rarely on such occasions that any one gets beyond "a little bit screwed."

After refreshing ourselves with bread and cheese and cider, for which our long walk over the bracing moors had given us a "hunter's appetite," we took a look at the "survey" which was progressing busily in a field hard by, and then proceeded on our way for Awsell Rock, in Buckland Woods, on the Dart. M. H.

(*To be continued.*)

Proceedings of Societies.

North London Photographic Association.

The first ordinary monthly meeting of this society, after the usual summer recess, was held at Myddelton Hall, Islington, on the evening of Wednesday, September 26th, George Shadbolt, Esq., in the Chair. The attendance was good, and the proceedings, although of a somewhat desultory character, were highly interesting.

The minutes of the last meeting having been read and confirmed,

Mr. J. T. Bell was proposed and elected a member of the association.

The Chairman exhibited a number of stereograms of lake scenery by Mr. Ogle, of Preston, some of which contained natural clouds, and were very much admired. It was remarked by some of the members, that the landscape had been sacrificed to obtain the clouds, the general effect being of considerable under-exposure. The chairman explained that this effect entirely disappeared in the stereoscope.

Mr. G. Wharton Simpson exhibited some stereoscopic negatives taken on waxed albumenized paper by Mr. Hooper, of Manchester. They were the mere experimental results of a new process on which Mr. Hooper was engaged, and were not intended for public inspection, nor were any details of the process as yet ready for publication. Mr. Simpson thought these specimens showed so much promise, in their delicacy, detail, and gradation as to lead to a hope that the process would be not less valuable for small than for large pictures.

Mr. Barber asked if Mr. Simpson knew anything of the sensitiveness of the process as compared with dry processes on glass, say the Fothergill process.

Mr. Simpson was unable to speak of the relative sensitiveness of the process; but believed that an unusually long exposure was not necessary.

Mr. Bingham referred to a remedy for blistering in the development of dry plates, which he had tried with success: it consisted in treating the plate with another coating of dilute albumen when the blister occurred.

Mr. Moens stated, that a German photographer, with whom he had recently conversed, always coated his plates after their final washing with dilute gum arabic. This had the effect of preventing the subsequently applied varnish from sinking in, and also protected the negative from injury if the varnish became softened in the sun and adhered to the paper.

Mr. Hughes remarked, that this plan was originally recommended by Le Gray. It was then intended to serve in the place of varnish, and he had himself for some time used it in that way. He had found, however, that it was very unsafe to trust to it without varnish, and had in several instances had valuable negatives stained by contact with the silver of the excited paper which had acted through the coating of gum.

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* Continued from p. 250.
† Tamer and Tavy.

Mr. Moens referred to a photographer at Rome who always used gelatine for varnish.

Mr. Hill remarked that such a plan might answer in the climate of Italy, but not in England, especially with our recent experience of summer weather. He thought, however, that the value of the gum or albumen coating ought to be more generally known as a means of saving many valuable negatives in which the film showed a tendency to leave the plate.

Mr. Shadbolt then vacated the chair in order to read a paper *On an Improved Form of Tripod Stand* for field use. All landscape photographers were familiar with the annoyances contingent on weakness of constitution in the camera stand, and it unfortunately happened that most of the contrivances that had been devised to remedy this weakness of constitution, had involved the necessity of extreme robustness of constitution on the part of the photographer who had to carry them. The points required in a good stand were rigidity, portability, and lightness, and the same time a height of not less than five feet. Mr. Shadbolt then proceeded to illustrate by diagrams, with chalk, upon a black board the form of tripod he had devised, and which, he thought, combined the points he had named; although each leg was in four pieces, and when folded was compact and portable, yet these pieces were so attached that they could not be lost or mismatched. When this stand was erected it gave the height required and at the same time from the judicious use, in the weakest places, of struts and clamps of a light and simple form, all of which were attached to their places and could not be lost, the utmost rigidity was attained. Mr. Shadbolt then exhibited an old tripod stand to which he had adapted a modification of the same principle which elicited general approbation.

A general conversation ensued, in which Mr. Hughes, Mr. Wharton Simpson, and others joined, on the wood most suitable for stands, in which Mr. Shadbolt remarked that his business avocations had rendered him all his life familiar with the qualities and characteristics of timber. Yellow deal he considered as most perfectly combining strength and lightness for the purpose. This was sometimes confounded with yellow pine, which was altogether unsuitable. The Norwegian, not the American timber was required for the purpose. The use of ash was a great mistake; it was heavy without being rigid. It was tough and elastic, but this very elasticity caused vibration, the thing most to be avoided.

Mr. G. Wharton Simpson then exhibited a specimen of arrowroot paper which he had received from Herr Liesegang, editor of the *Photographisches Archiv*. It was intended to supply the place of albumenized paper for portraiture; the surface being prepared with a starch of arrowroot instead of albumen, and possessed all the delicacy without the offensive glaze of the latter.

Mr. Shave remarked that he thought there was a considerable field open for experiment, not simply as to preparing the surface of paper with a suitable coatting, but for the manufacture of some tablet like the artificial ivory.

Mr. Hughes said the great objection was the difficulty of getting rid of the chemicals in such preparations. In the artificial ivory it was almost impossible to do so by any amount of washing; besides which, the tablets curled up in washing just like a cake of glue would do, so that it was impossible to use them with success. He would bring to the next meeting one which he had taken five years ago, which was at the time one of the sweetest photographs he had ever seen; but was now in a state of hopeless decomposition, and completely yellow.

Mr. Cramb, secretary of the Glasgow Photographic Society, remarked, that from some experiments of his own, he found the process of printing on real ivory as simple as on paper, and the results quite as good. He had not tested their permanency for a longer period than nine months, but thought that long enough to justify hopes of their entire permanency. General difficulty had been found in the depreciation of the whites, and the extent to which the grain of the ivory showed, both in whites and blacks. By a slight modification of the usual printing process he found he could get perfectly pure whites, and almost entire freedom from the appearance of grain in the ivory. He hoped shortly to make some public communication of the details.

Mr. Hughes said he printed on ivory in 1854, but had not pursued the matter, because he did not see a probability of a fair commercial return for the trouble it would involve. He referred to a process which had been practised with success by Beard and Sharp, the particulars of which had been preserved as a carefully guarded secret.

Mr. Wall remarked that he had sent some negatives to those gentlemen, and had received very inferior print sindeed; so much so that he could produce better paintings on ordinary paper prints.

Mr. Cramb's experiments had given him such confidence that he would undertake, if any gentleman would send him a marked piece of ivory, to send back a perfect picture on the same, which would prove that it was the result of one experiment, and that there was no risk of failure.

Mr. Dawson remarked, that much of the ivory now in the market was not obtained direct from the elephant; but was fossil ivory; and that its quality must be considerably altered by remaining centuries under ground. That might account for the difficulties of some persons.

Mr. Mainwaring exhibited some beautiful coloured photographs of flowers, which elicited much admiration.

Mr. Hughes wished to call the attention of members who might have opportunity of coming into contact with manufacturers of paper, to the fact that large quantities of hyposulphite of soda were used in the manufacture of paper. It was used to neutralise the chlorine requisite for bleaching, and was called "antichlor." He wished members to endeavour to ascertain what an extent it was used in photographic papers, and if used on the Continent, from whence most of our photographic papers came.

Votes of thanks were then passed to Mr. Shadbolt for his paper, and to the various gentlemen who had exhibited articles of interest.

The proceedings then terminated.

Dictionary of Photography.*

Printing, Photographic.—Printing in Photography is the process by which a positive impression on paper, glass, ivory, &c., is produced from a negative on glass, paper, or other transparent substance. There are various methods of printing which are chiefly divided into two classes,—printing by super-position, and camera printing. The former method is divided also into two distinct methods:—sun-printing and development printing.

Sun-printing is based on the known tendency of chloride of silver under certain conditions to blacken under the action of light. A sheet of paper is suffused with a layer of chloride of silver, and covered with a negative image in which the parts intended to be white in the resulting positive are opaque; the parts intended to be black are transparent, and the parts intended to represent the various half tones graduating from white to black, possess various graduated degrees of semi-transparency. The film of chloride of silver thus covered with a negative is then submitted to the action of light, until the required depth or amount of blackening is effected; after which, to fix the print the unaltered chloride of silver is removed by means of some solvent of that salt, such as ammonia or hypo-sulphite of soda, so that no further action of light may take place. The darkening of chloride of silver is materially affected both in rapidity and as regards subsequent colour by the kind of organic matter with which it may be in combination, such as albumen, gelatine, starch, &c.

The conditions necessary for the production of a successful picture from a negative by means of sun-printing, one in which all the sharpness, vigour, and delicacy of gradation existing in the negative may be reproduced in the finished positive print, and of a tone satisfactory to the eye, are—the use of a paper of an even firm texture, with a fine solid surface so prepared that an even layer of chloride of silver may be kept while on the surface; the presence of a sufficient quantity of chloride of silver in contact with a sufficient excess of nitrate of silver, and a method of toning and fixing which shall produce the right colour and secure permanency without impoverishing the vigour or delicacy of the print.

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* Continued from p. 224.

Albumenised paper, notwithstanding some objections to the glaze, is thought by most photographers to afford the best facilities for complying with those conditions, the delicacy of its surface rendering with the utmost sharpness and truth, the gradations in the negative. The process is as follows:

To prepare the albumen; Take of fresh laid eggs, a number depending on the amount of paper to be albumenised. Remove the yolk and germ, and to each measured ounce of albumen add from a quarter of an ounce to one ounce of distilled water. The quantity of water to be added must depend upon the amount of glaze required; some photographers preferring a highly albumenised surface, especially for small and stereoscopic pictures, and others preferring, especially for large pictures, the smallest possible amount of gloss compatible with vigour. About half an ounce of water to an ounce of albumen will give a very good surface. To each measured ounce of the mixture add from ten to fifteen grains of chloride of ammonium or of chloride of sodium. The amount of salt now added determines the amount of chloride of silver which will be subsequently contained in the excited paper, and this again determines the character of the print. If great vigour and contrast of light and shade be desired, the fullest proportion of salt is necessary. For printing with weak negatives, which might be otherwise deficient in vigour, a paper so prepared is desirable. On the contrary, for use with a very intense negative having a tendency to excess of contrast a weakly salted paper will give the best results. The salt should be first dissolved in the water, which should then be added to the albumen, and the whole thoroughly beaten together. It is of the utmost importance that this part of the process be carefully and thoroughly effected; for unless the albumen be well beaten, streaks must inevitably occur in the paper. The use of a bundle of quills is the most usual method of beating the albumen; an excellent plan has been suggested of putting the solution in a strong bottle, and adding to it a handful of very fine gravel, with which the whole is to be well shaken for fifteen or twenty minutes. It should now be allowed to stand for some hours, and then decanted, pouring it through muslin into a flat dish.

Some manipulators recommend the use of a few drops of acetic acid, and others a small quantity of ammonia, to increase the limpidity of the albumen. If the latter be used it should either be neutralised or suffered to escape by standing some hours in an open dish. It should be remembered, however, that if excessive limpidity be produced, the albumen will be more apt to sink into the texture of the paper, instead of remaining entirely upon the surface, and thus largely defeat the very end to be attained.

The quality of the paper will also materially affect the finished result, and here it is difficult to speak definitely, samples of paper vary so much. We can merely remark that we have generally produced and seen produced, the best results with the Saxe paper. It should be pure in colour; fine, even, and close in texture, and free from spots.

The paper having been cut to the proper size, should be marked on the side having the finest surface, in order that the albumenising may be effected on that side. One corner of the paper is then turned back so that it may not come in contact with the surface of the albumen; then holding this corner in the left hand, and the opposite one in the right hand, place this last corner on the surface, letting the sheet down gently in such a manner as to avoid forming air bubbles. When it has remained in contact for about a minute lift it up by the corner which is turned back, and hang it up to dry by pinning this corner to the edge of a shelf, or attaching it to a line by the American pegs for that purpose. A small portion of blotting paper should be attached to the opposite corner, which will prevent the albumen from forming a thick ridge.

To secure a good surface the process of drying should not be too slow; the temperature of the room should not be suffered to fall below 60° Fahrenheit. Some operators prefer to iron the paper when dry with a hot iron, for the purpose of coagulating the albumen. There is some doubt, however, whether this is properly effected by means of dry heat so applied.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 26th September, 1860.

Among the numerous useful applications of which photography is capable, there is one both novel and amusing which deserves to be recorded. Urgent private affairs detaining a certain prince at Palermo, he could not as usual, pay his annual visit to Paris this summer. But the prince's wardrobe required replenishing, and with a new Neapolitan dynasty came new fashions; the prince was in a state of sartorial despair, till the happy thought occurred to him to be photographed, on the scale of one inch to the foot, and to send the proof to an eminent Parisian *tailleur*. The artist took his measures accordingly; the suit was duly made and forwarded to Palermo. I have just been shown the prince's letter to the tailor; he proclaims the fit to be admirable. He is delighted, and so is the tailor. The prince sent another photograph representing him in his new suit. It is easy to see that it is a perfect fit.

At the recent chemical congress held at Carlsruhe, it was decided to adopt the notation Є, or barred C of Berzelius, instead of C^2; the bar will, therefore, always indicate two molecules, or two equivalents.

The object of this congress, which consisted of upwards of one hundred of the most eminent chemists in the world, was to endeavour to establish among chemists a definite nomenclature and uniform chemical notation. The meetings were continued three days, the last being presided over by the celebrated Dumas. Some of the most delicate points in chemical philosophy were discussed, such as "the nature of matter," "the constitution of bodies," &c. The most divergent opinions were put forth, and very animated and piquant discussions took place, which, it is hoped will lead to profitable results. The president summed up with his peculiar perspicacity and elegance of diction; reviewing retrospectively, the progress of the science of chemistry, the principles which guided our predecessors in their investigations, who were in general much more anxious to carefully establish well demonstrated facts than to assert hypotheses, the fate of which is, to be abandoned sooner or later, for others. In concluding, the worthy president expressed a hope that this congress would not be the last, but that the chemists of the various countries of Europe would meet again next year to discuss the fundamental principles of a science now cultivated with so much ardour and success. The amount of actual business transacted at this congress is certainly not very great, but probably as much as could have been expected from a first meeting. It will take time for the elements to agglomerate. We hope it may be our province next year to record many useful and important results of the labours of this congress of chemists.

An interesting and curious application of the electric light has recently been made at Schaffhausen, on the Rhine. The famous cascade or waterfall at that place, ninety feet in height, was illuminated by five electric lamps. The effect obtained was marvellously beautiful, especially when the light was transmitted through red or green glasses. This experiment was made at the instance of the Swiss Railway Company, who propose, if the attempt proves successful, to organise a series of night fêtes next summer, one of the most brilliant features of which will be this illuminated cascade. The management of your Crystal Palace might take a hint from this experiment: the grand system of fountains there illuminated by coloured electric lights would far surpass any fete that can be organised at Schaffhausen.

The numerous cases of poisoning resulting from the employment of the pigment known as Brunswick green, or arsenite of copper, has induced our sanitary board to take measures to suppress its use in various arts as those of the dyer, calico printer, paper stainer, &c. Many articles of ladies clothing dyed with this pigment, artificial flowers, &c., have caused dangerous illness to their wearers. In light materials, as gauze, tarlatan &c., this pigment is shaken out in considerable quantities during dancing, or rapid motion accompanied by friction, and finds its way into the faces and nostrils of the wearers, producing the most alarming symptoms.

The results of the expedition of the brothers Schlagintweit into the Himalaya and Central Asia will soon be given to the world. The publication will form nine volumes, accompanied with a magnificent atlas. It comprehends observations of every kind made in those vast regions situated between Ceylon and Kuchgar, and between Scinde and Assam, from the 5th to the 38th degree of northern latitude, and between the 64th and 94th degrees of longitude, east; countries partly unknown, or at least imperfectly known. The first volume of these researches, just completed, contains very important astronomical and magnetical observations. The authors have determined the geographical positions of a great many points in the Himalayas, in Thibet, and in Turkestan. They have found that in certain parts of Thibet, the latitudes given by Jaquemont, Moorcroft, and Strackey are tolerably exact, while the longitudes are exaggerated in the Eastern direction; the longitudes of Kuchgar and of Turkand, are wrong even more than 2°. As to the direction of the principal chains of mountains, the brothers Schlangintweit have discovered that the separation of the waters is not effected by the Huan Lun, as indicated on the maps of Klaproth and Humboldt, but by the Karakoroum, a parallel chain to the Himalaya. The magnetic observations made in India previous to the labours of the brothers Schlagintweit were limited to the magnetic declinations taken along the coasts, for the south only we had the more complete observations of Caldecott, Taylor, and Brown. The Schlagintweits have observed the three magnetic elements in every country through which they passed. The line without declination approaches the mouths of the Indus, and continues southward at about $2\frac{1}{2}$° from the coast. In the valley of Bramapootra, a region of very great extent presents a remarkable anomaly in the declination of the magnetic needle. The zone of the most rapid variation in declination is comprised between the 29th and the 34th degrees of latitude, and the 71st and 80th degrees of longitude. The magnetic inclination follows a very regular path in these countries, but local influences very often make themselves felt. Observations on intensity have furnished very unexpected results. In India the isodynamic lines show a general tendency to curve towards the south; all along the Himalaya, comprising the borders of that mountain, a zone of intensity much above the mean is found; besides, the observations made by Brown confirm the results of Schlagintweit. These travellers believe they can explain the anomalies in question by the powerful tropical solarization, which probably modifies the magnetic condition of the argillaceous strata of the soil: inasmuch as the zone of depression of intensity is where the slopes of the Himalaya diffuse a constant humidity. The forthcoming volumes of these researches will contain observations on hygrometry, geodosy, meteorology, geology, botany, and zoology; besides studies relative to the languages, and to ethnographic anthropology, with descriptions of landscapes. The atlas accompanying this vast work contains maps and drawings of every kind; the first part consists of ten splendid views, executed in chromo-lithography, from the water-colour drawings of the authors, who made seven hundred and fifty during their travels.

Mr. Benjamin Pierce, the American astronomer, has made known the results of his researches on the nature of comets, which are established mainly on a study of Donati's comet. He attributes a metallic density to the nucleus (from 3 to 20); he surrounds it with an immense atmosphere, within which is deposited the matter of the nucleus evaporated by solar heat ascending with a very great velocity. In proportion as it ascends, this vaporous envelope becomes electric, like a cloud, and at a proper distance from the nucleus, it yields to the repulsive action of the electricity of the sun. The intensity of the electricity attains its maximum in the particles of the anterior border of the tail; this maximum intensity for Donati's comet is two-and-a-half times as much as gravitation. The particles in arrear of the anterior border will be much more feebly electrified in proportion to their distance from the border. As to the transversal sections of the tail, Mr. Pierce believes that near the nucleus they are circles; but that they become ellipses more and more elongated in the direction of the orbit, in proportion as they recede from the nucleus. When the comet has a very small perihelion distance, the tail, formed during its approach to the sun, is behind, and becomes confounded with that which is formed after passing its perihelion, which causes the immediate emanations to appear to extend to much greater distances than they do in reality. It is necessary to admit that it is not the nucleus itself, but rather its immediate envelopes, upon which oscillations have been observed; taking into account the displacement of these envelopes in estimating the periods of oscillation. In this manner Mr. Pierce found the period of vibrations for Donati's comet equal to seven days and a half, and the total surface of the oscillation 30′. This theory is incompatible with the hypothesis of a resisting medium. Mr. Pierce thinks that he must examine the part that the magnetic and electric actions play in the planetary phenomena; he has some hope of explaining by them the mysterious discords which still exist in the theory of Mercury and in that of the Moon.

Immense quantities of nitrate of soda are imported into England for agricultural fertilizing. Mr. George Ville has examined the question of the policy of employing this nitrate. He finds that soda is found naturally in greatest abundance in marine plants, and that it diminishes as we recede to the interior of countries, where it disappears as a principal element. He finds that although potash may in many cases be substituted for soda, soda cannot so well be substituted for potash. In experimenting with wheat he found that the addition of potash caused double the yield that soda gave; but if a silicate of potash be added to the nitrate of soda, the result is the same as that obtained from nitrate of potash. His conclusions are, that nitrate of soda, mixed with phosphate of lime, is not very efficacious as a fertilizer, but that the addition of potash immediately communicates great efficiency.

Photography in Germany.

Elberfield, Germany, Sept. 21, 1860.

Dear Sir,—I have but a few days since returned home from England, (having made, in returning, a journey to the South of France and Switzerland); I remember my promise to send you novelties from Germany. I see your Paris correspondent has given you an account of German photography, and so you already know the principal names and characteristics; only one point I believe I must protest against: the Germans do not stand behind any other people in the photographic art. Everyone who has seen the photographs of our first artists will tell you that in photographic *portraiture* their work is as good or better than of foreign artists. Unfortunately, the Germans do not send pictures to the French and English exhibitions; if they did I think they would compare favourably with the best exhibited.

The alcoholic collodion is almost generally used here; many employ it iodized with lithium salts; the best proportions, I believe, are the following:—

Alcohol	370	grammes
Pyroxyline	10	"
Ether	200	"
Iodizer, consisting of (100 grammes alcohol, 2 grammes bromide of cadmium, 6 iodide of cadmium, 6 iodide of lithium	58	"

Printing through ground glass is now coming much into fashion; the results are beautiful if the negatives be not too dense. Then, as you mentioned already, the general enthusiasm is for arrowroot paper. In a few days I hope to send you a quire of our preparation, with another lot we send to England. I tried the toning with double chloride of gold and potassium, and found it to answer very well.

The Vienna *Hof-und Staatsdruckerei* publishes a process of photolithography; the negative must be quite tranparent in the light and very dense in the dark parts. Only subjects executed with lines or points can be reproduced; for portraits or landscapes after nature, as is common with most of these processes, it is not suited, but for reducing maps and such things it seems to be capital, as a specimen map shows.

The *preparation of the stone* is as follows;—One part of asphalte is dissolved in 20 parts of chloroform, and filtered. In the use of chloroform lies the goodness of the result; by it the asphalte becomes much more sensitive to the light, and the contours very clear and defined.

The stone is to be coated with the above sensitive preparation in the dark; after fifteen or twenty minutes the film is dry and is exposed to the light under a negative from one to three hours. The picture is then only visible in thin traces. It is developed in the dark (after the stone has become cold, if exposed to the sun) by oil of turpentine, diluted by a small quantity of alcohol or benzole. When the picture is visible the dissolved parts are to be washed off with plenty of water.

T. P. recommends in the *Photographic Archive*, the use of chloride of copper (a very dilute solution of it in water) after the fixing of prints in the hypo bath; he says the proof becomes stable by this bath, the hypo remaining in the print being destroyed.

A solution of chloride of copper is also admirably suited to reduce over exposed negatives.

A beautiful mirror-like surface can be given to positive prints (upon plain or arrowroot paper) by the following method:—

1. In 5 ounces of distilled water, 2 ounces of good white gelatine are dissolved by application of heat.
2. *Collodion.*—3 ounces of ether, 4 ounces of alcohol, $1\frac{1}{2}$ drachms of pyroxyline.

A well cleaned plate-glass is to be coated with the collodion, 2; after drying the film is washed with water until the oily streams disappear and coated with the gelatine solution, 1. These plates may be prepared a long time before using.

The positive print is wetted and laid upon the gelatine film, avoiding air-bubbles. After five or six hours the paper is dry, and can be removed from the glass by cutting off the edges of the collodion with a knife.

With the paper I shall send you a copy of my new book on photography.—Believe me, sir, yours faithfully,

Paul E. Liesegang.

Photographic Notes and Queries.

Toning after Fixing.—Cracking of Film.

Sir,—As a double annual subscriber to your journal I shall be obliged if you will answer the following questions in your answers to correspondents.

Can positive prints after having been toned, fixed in hypo, and thoroughly washed, be again put into the toning bath, and not require to be fixed and washed again? (I use "Theta's" formula).

2. Some negatives, (10×8), which I had lately taken-about three days after having been varnished with chloro, form varnish have been cracked in the film all over in this manner.

[The cracks here depicted are very similar in appearance to those in some samples of black varnish a few months after application.]

The cracks are very sharply defined, and not ragged at all at the edges. I shall be obliged if you will tell me what is probably the reason of this. I have taken a great many negatives, and have never had this occur before.—I am, sir, yours obediently, C. Scholefield.

[Prints may be toned after fixing; but especial care must be taken to wash them well first. It requires a very long immersion in the gold bath to obtain any depth of colour. They will not require fixing again, but they must be washed. We never met with a varnish which cracked the film as you describe, and can only offer a suggestion on the subject. Some gums, such as copal, swell very much when in solution, like glue in water, and contract of course in an equal degree as they become thoroughly dry. Copal varnishes crack in consequence even on oil paintings, and under some circumstances crack the paint as well. Your varnish has probably been of similar quality, and a strong body of it, contracting in drying, would produce the effect you describe. A spirit varnish is best for negatives, and according to our experience, a chloroform varnish worst.—Ed.]

Collodion Failures.

Dorset Square, September, 1860.

Sir,—In attempting to make some positive collodion by the formula given by Mr. Gage in a recent number, I met with what I suppose I must regard as a positive failure.

I intended making two ounces, and therefore put into a bottle one ounce of absolute alcohol, (which I knew to be so as I distilled it myself), and 1 oz. of ether, (methylated). I then added 7 grains of pyroxyline (made at a low temperature) which, when dissolved, which it did perfectly, made the collodion so thick that it would scarcely flow. I then added equal portions of alcohol and ether till it reached $3\frac{1}{2}$ ozs. which I now determined to iodize. To $\frac{1}{4}$ oz. of alcohol I added 20 grains of iodide of cadmium (not being able to obtain iodide of zinc in my neighbourhood) which dissolved perfectly, to which I added 4 drops of solution of iodine, and then added it to the collodion, when immediately it turned very turbid, of a yellowish colour. I then dissolved 15 grains of bromide of cadmium in another $\frac{1}{4}$ ounce of alcohol, and added it to the collodion which still remains as at first, without the least apparent disposition to precipitate. It has now been made five days, and still retains its turbidity, and is now rather thick with just double the quantity of solvents recommended by Mr. Gage. I thought perhaps I had made a mistake as to the quantity of pyroxyline, but have since made another trial with the same result. I have not used any of the collodion, supposing it be of no use. If you, sir, will kindly put me right in this matter I shall feel obliged.—Yours, very truly, John Clarke.

[Your gun cotton had been made at a temperature much too low. The quantity named is really a minimum proportion; we have dissolved as much as eight grains of good cotton to one ounce of solvents mixed in the proportions given by Mr. Gage. Cotton made at a very low temperature always gives a thick glutinous collodion, and the iodide of cadmium would tend to gelatinize it still more. With such a cotton you require large excess of ether and an alkaline iodide to make it available; but nothing will make it first-rate.—Ed.]

How to make a Vignette Glass.

Sir,—Information being the order of the day among photographers, I beg to submit my mite for the benefit of your readers. In the first place, provide yourself with some pieces of ruby tinted glass; secondly, a small bottle containing fluoric acid; the bottle to hold this acid must be made of gutta percha, a piece of tubing of that material stopped at one end to form a bottle will do. To use, take a small dabber of cotton wool wrapped round a thin stick, dip the wool in the acid, then rub lightly in a circular direction on the stained side of the glass till your object is accomplished. N.B.—Be careful not to get any of the acid on your hands, as it will injure them.—Yours,

Sheffield. Sharrow.

Transferring Positives.

Reigate, September 24, 1860.

Sir,—Your correspondent, "H. S." will find the following a very easy, and with a little care, successful method of tranferring positives from glass to paper:—Half fill a bottle with "benzole" and fill it up with shreds of the very thin pink gutta percha, which is easily torn into shreds. Then place the bottle in hot water until the whole of the Gutta Percha is dissolved, and put it by to settle. The colouring matter in the gutta percha will sink to the bottom, and leave a perfectly clear solution which should be poured off into another bottle, and should be of the consistence of thick gum water. When required for use, the bottle should be placed in warm water. The positive, having been varnished some time previously, should be placed level on a levelling stand, a wine glass will answer the purpose, and sufficient of the gutta percha solution poured on to it to cover it well up to the edges, this should be allowed to remain on a few minutes to set partially, and the glass should then be very gradually tilted to allow the surplus solution to flow back into the bottle, then hold the back of the glass to the fire until the gutta percha has set, it will set perfectly transparent, with *heat*. It will be better not to proceed with the transfer till the following day. Having cut some black paper rather larger than the positive, place it on a board and cover it well by means of a broad flat brush, with thick gum water, into which has been put a small quantity of spirit of wine to prevent its turning acid, then put the glass with the positive into cold water, and allow it to remain until you find by lifting one corner of the collodion that it will separate easily from the glass: now carefully remove the moisture with clean blotting paper, (having previously placed the positive collodion upwards upon a sheet of glass larger than itself). The gum side of the black paper must then be gradually lowered on to the positive, commencing at the lower end, and smoothing the paper as it falls with the finger. When dry, by lifting one end of the paper it will bring away the collodion film with it, and if carefully done, perfectly smooth, and free from air bubbles. This method is equally applicable to negatives, by using waxed paper instead of black paper; but the negative must be removed from the glass *under water*, and when floating at the top turned over and the glass brought up to it; when, after being dried with blotting paper, the waxed paper gummed is placed upon it, it will then have the same side towards the paper that it previously had to the glass, and will print almost, if not quite as well as when on the glass.—I remain, sir, your obedient servant, Thomas Barrett.

Transferring Positives to Paper.

Sir,—I send the required quantities for use with my formula given a fortnight ago:—

Shellac	4 drachms.
Borax	1 drachm.
Boiling water	4 ounces.

I need scarcely add that the above will not answer for *varnished* pictures.—Yours obediently, R. E. X.

Miscellaneous.

Photography in the Patent Office.—*The Scientific American*, referring to the official report of the Patent Office, of the United States, speaking of the drawings which accompany it, remarks:—They are printed from photographic plates, prepared by a method secret with the contractor, Mr. E. P. Jewett, of Buffalo, N. Y. The printed specimens that we have seen are well done—better, indeed, than might be expected, considering all the circumstances. The original drawings were furnished by the Patent Office, and were done by hand in pencil; but on so diminutive a scale that it was found necessary to enlarge them. The bits of paper containing the drawings were then pasted upon stiff sheets, each having as many pictures as were necessary to constitute a page of the book. The drawings, thus arranged, were enlarged, several at a time, by the photograph, and thus reproduced upon metallic plates, ready for printing. With such a practical evidence of the convenience and success of the photograph in copying drawings, we wonder that the Patent Office does not at once discard the present clumsy and costly system of hand labour. Reducing by hand, and then enlarging by the photograph, seems like putting the cart before the horse. Why not use the photograph to start with, and thus produce far better originals, of the exact size required, at a less expense and all at one operation? The ascertained cost of copying linear drawings by the photograph is only about *one-tenth* as much as the hand system. Such are the results obtained at the Ordnance Office in England, in which a saving to the Government of $200,000 per annum has been effected by the adoption of the photograph for this particular purpose.

Talk in the Studio.

Water in London.—In a careful and elaborate report to the New River Water Company, Professor Spencer, in speaking of the corrosion of iron mains and the effects of gas leakage, states that it is computed that there are 4000 miles of gas mains laid under the roadways of London, from which 600,000,000 feet of gas are annually absorbed into the earth, the far larger proportion of which could be saved by improved conduits. As a matter of economy its results would pay a dividend of 5 per cent. on the gross capital of the London companies. It is a question for photographers how far the extraordinary excess of carburetted hydrogen with its other impurities, contaminating their water at times, may account for exceptional and unexplainable phenomena and puzzling failure.

"Artist" and "Doorsman."—Two men, one styling himself a "Photographic Artist," and the other a "Doorsman," were recently charged at Lambeth Police Court with a cash-box robbery from the premises of a baker adjoining their "studio." The evidence not being conclusive, they were discharged.

Poison Bottles.—The *Lancet*, in referring to several recent cases of accidental poisoning strongly recommends the adoption of bottles with contracted necks, for all liquid poisons. From these the contents can only be poured by drops—*guttatim et gradatim*, by which means it would become apparent to any person using them that caution was necessary in the use of the contents.

Exchange Club.—A correspondent who sends us several excellent specimens remarks, "I am quite satisfied with the rules laid down for the former club; and out of twelve dozen received, at least three-fourths of the number were very fair specimens."

Albumen Process.—We understand from Mr. Cramb, of Glasgow, that he finds the old albumen process on glass, slightly modified, more sensitive than any of the dry processes in which it is combined with collodion. He recently obtained a negative with an exposure of fifteen seconds in the shade.

A subscription for the publication of photographs from Alfred Rethel's historical pictures has been for some time on foot, as we are informed, for the benefit of his widow. It is needless for us to say how magnificent his works are. We cannot hesitate to regard him as one of the soundest and best painters of the modern German school.—*Athenæum.*

To Correspondents.

⁂ Our Correspondents will aid us in our endeavours to solve their difficulties if they will in all cases state details of their operations when failures occur; and when referring to former articles in the News giving the exact reference. Signatures, such as "Positive," "Subscriber," and others of a like nature, should be avoided, as it sometimes occurs that two correspondents make use of the same signature. Initials are generally best. Letters intended for the Editor should be addressed expressly to him.

L. M.—Referring to a recent transfer process given by one of our correspondents asks, with a scarcely repressed chuckle, "what book on chemistry states that shellac is soluble in water." L. M. will find that any work which treats of the subject at all will inform him that shellac is soluble in hot water to which *borax* is added, as stated in our correspondent's letter in giving the recipe.

S. H. M.—There is not, that we know at present, any such preserver as you describe in the market. When opportunity serves we will place your suggestion before some manufacturer. Your good opinion and cordial good wishes are very gratifying, as such expressions from correspondents must always be.

A. B. C.—A top light only will give you very unsatisfactory results. A combination of top and side light is absolutely necessary to good portraiture. A quarter-plate lens is only intended to cover a quarter plate picture, which is 4½ by 3¼. We have known some which would moderately cover 5 in. by 4 in., but not more. Various formulæ for such a solution have been published, but we know of none giving certain results but that announced in our advertising columns, the composition of which is a trade secret.

L. A. D.—A bright light, but not direct sunshine, is best. It is difficult without seeing results to give an opinion as to the defects or their cause. Possibly the negatives were over exposed, as that would cause want of intensity and contrast. For portraits try the development given in our last in answer to H. S. Ward. Pyrogallic acid should be kept dry and in a bottle, not in paper.

G. A. Bowering.—Some practice is necessary to acquire skill and certainty in transferring positives to cloth of leather. The best mode of rubbing down the cloth so as to exclude air-bubbles is by means of a roller covered with a piece of vulcanized india-rubber tubing. But the great secret is in the use of a suitable collodion. It should be of good body and manufactured from pyroxyline made at a low temperature. It is next to impossible to succeed with a thin collodion of porous texture. Some operators prefer to take the picture direct on the cloth which is first attached to the glass. Your film appears much too thin, and wauting in tenacity to transfer properly.

Excelsior.—We do not generally like negatives intensified by means of bichloride of mercury; they are rarely satisfactory; we will, however, answer your queries on the subject. The collodion generally used is positive. The exposure nearly double that for a positive. Development with the same solution as for positives (omitting any nitric acid in its formation), but carried a little further. Fixing solution, cyanide about 5 grains to an ounce of water. To intensify, apply a solution of bichloride of mercury, about 20 grains to the ounce of water. To get this dissolved it should be powdered and the water made hot. This solution will perform its office in about five or ten minutes; wash well and apply a solution of ammonia, about ten drops of strong liquid ammonia to an ounce of water. When black enough wash well, dry, and varnish. If the mercury be dissolved in muriatic acid it will destroy the film.

Pyro.—Cotton is a more certain material from which to make your pyroxyline than paper. Be careful if you are going to make your first attempt. The least evil you risk is serious burns from the corrosive action of the nitro-sulphuric acid if sparks of it touch the skin; and the worst, inhaling the red nitrous fumes which may arise, and just sufficient to fill the lungs once, would render them incapable of filling with anything more. About 140° is the right temperature. Wash thoroughly, the more the better, and pull out as much as possible previous to drying.

Stereo.—There is a desire on the parts of some subscribers to have the rules of the Exchange Club revised. At present the rules are simply these:—That all persons desirous of exchanging prints shall forward their names and addresses to the editor of this journal, with a specimen print or specimen prints from their various negatives for his approval, on receiving which, their names and addresses are published at intervals in the Photographic News, thus enabling them to exchange with each other through the post. We shall publish the rules in detail next week, and a list probably the following week.

Thomas Lodge.—The address of the "Architectural Photographic Association" is No. 9, Conduit Street.

J. Webber.—The address of the Lime Light Company is 33, Cornhill.

G. C.—It is very improbable you would succeed with the formula given, nor indeed with any other. We have before stated our conviction that amateur varnish making is an error. It requires considerable experience in the choice and combination of gums and the selection of their solvents to make a good varnish. A good positive varnish may be made by adding about 20 grains of gum dammar to one ounce of benzole, but you may try half a dozen samples of benzole without meeting with one just suited to the purpose. All strong-bodied varnish nishes lower the tone-class positives more or less. (See advertising columns for a positive colouring varnish. The varsold as "alabastrine varnish" is admirable for colouring on.

R. W. S.—Do not tamper with your silver bath when it is once in working order. You may secure almost every variety of positive by modifications of the collodion and developer.

C. Eades.—We will endeavour to obtain the necessary information by next week.

Leake's Tent.—An error in the description of this excellent tent occurred in a recent advertisement. The weight was stated to be 15-lbs.; it should have been Five Pounds. The value of a portable tent is often, *ceteris paribus*, in inverse ratio to its weight, it is important, therefore, to note this distinction. Mr. Leake's tent is in point of fact one of the lightest we know, possessing the same convenience.

B. T.—It is better to keep all silver solutions and salts of silver in the dark. Yellow bottles are useful for the purpose.

Steady.—We prefer the use of a head-rest in portraiture; but it should be placed so as to support without constraining the sitter.

J. Hilton.—Toning does not add to the permanency of a picture. If it be perfectly fixed in fresh hypo, there is every reason to expect it will be permanent. The old hypo-toning bath introduced an element of instability into the print. The method now recommended avoids that, but it plays no other part in permanency.

Juvenis.—What is termed over-development of dry plates is often simply the result of too copious addition of silver to the developer. Dry plates will generally bear a great deal of development so long as it be sufficiently gradual, and not forced by the addition of silver.

Helios.—In competent hands there is no process more certain than the Daguerreotype. Nothing in photography has ever equalled it in delicacy and beauty. We sigh in vain for its revival. Some good "alabastrine" pictures come nearest to it in effect.

Exchange Club.—Those of our Correspondents who wish their names published in the next list will be so good as to remember that in publishing their names we assume the responsibility of implying that their productions are up to the mark in quality. It is important, therefore, that a specimen print be in all cases forwarded with the name. A few of our Correspondents in sending their names to be entered on the Exchange list, have not complied with this necessary requisition.

Some Correspondents have intimated that a revisal of the rules upon which the Exchange Club is conducted is desirable. We shall be happy to receive suggestions on this subject.

All Letters, Works for Review, and other Communications for the Editor, should be addressed to the Office, 32 Paternoster Row, London.

Advertisements and Communications for the Publisher for the current number, to be addressed to the Office, 32 Paternoster Row, not later than 3 o'clock every Thursday. Post-Office Orders are to be made payable to Mr. Thomas Piper, at the Money-Order Office, St. Martin's-le-Grand.

THE PHOTOGRAPHIC NEWS.

Vol. IV., No. 109.—*October* 5, 1860.

PHOTOGRAPHIC SCHOOLS.

It is one of the singular facts in the history of photography that whilst thousands of persons are at this moment practising it, with a greater or less amount of skill and success, as their sole reliance for an income, there is scarcely one to be found who has received any special education or training for its practice, or served any apprenticeship to it as a profession. However easily this fact may be explained there can be little doubt that it is, in the majority of cases, deeply to be deplored. The art which has supplanted, almost entirely, that of the minature painter, and largely those of the draughtsman, the lithographer, the engraver, and the printer—in all of which a careful training and long apprenticeship is required—is practised by persons who for the most part have, by the exercise of tact, natural aptitude and ability, "picked up," often comparatively unaided, their whole stock of knowledge and skill in the practice of photography.

A contemplation of this view of the case has induced Mr Root, one of the oldest and most artistic photographers in the United States, to call attention to the importance and value which would attach to the establishment of a photographic school or college. His remarks on the subject are so much to the purpose, and so thoroughly characterized by good sense, that we offer some extracts for the consideration of our readers; premising that the majority of the remarks will apply with equal force to this country as to the United States.

"For the practice of all the useful arts previous instruction is universally held necessary. No mechanic puts out his 'sign' without having served an apprenticeship to his trade—in other words, having been schooled therein. With the so-named fine arts it is the same. The painter, the sculptor, the architect, &c., must be long and laboriously schooled to become skilled in their professions. The place of their novitiate is a school, whether private or public, whether having one pupil or twenty. In regard to some arts there is an advantage in the gathering of *numbers*, from the mutual emulation, helpfulness, &c., incident thereto.

"Now, why should we not have schools for instruction in Heliography? Whether this be regarded as one of the useful, or of the fine arts—as requiring simply that *mechanical* aptitude and skill, which suffice for the former; or, in addition to these, that original genius, which is the central inspiration of the latter; in either case, intelligent, thorough instruction is essential to qualify one for successful practice therein. And, for acquiring such instruction, a school, supplied with proper instruments and appliances, and supervised by a person *at home* in both the theory and practice of the art, where numbers could together receive instruction, while at the same time aiding each other's progress, would unquestionably be the best mode that could be devised.

"That Sun-painting is a useful art is undeniable, if mental discipline and development are useful. That it also ranks with the fine arts is—contrary to former views—becoming more and more widely recognised. A good eye—even if not much trained—can detect the world-wide difference between one heliograph and another; can perceive that one is lifeless, soulless, an unattractive form merely: and that another is living, human, diaphanous with spirit, a literal fac-simile of the thinking, moving original. And why is this? Because the one is produced by a mechanic, and the other by an artist; the one is a result of mechanism, the other of art. Under the latter category, then, heliography most pressingly needs a school for comparative instruction: for its artistic capabilities and practice are as yet very little understood, and it exists chiefly as a process of bold mechanism.

"The mention of a few items will intimate the immense service which a competent school of the class supposed might render.

"Thus, practitioners, especially in secluded localities, often encounter difficulties in one or another branch of their operations—*e.g.* in the manufacture of collodion; in the solutions; in the films proper to the several species of pictures, &c.; while streaks, spots, pinholes, &c., vex, baffle, and delay their work. In the school suggested the nature and causes of such difficulties would be explained, with the modes of rectifying them.

"Not, however, in this chemical department only would instruction be of great value; but not less in what, properly considered, is the artistic department. Thus, in regard to the management of the instruments, of the lights and shadows, &c.; in the settling of the position of the bodily conditions generally: in a word, in the use of all those appliances, material and mental, whereby is produced a representation of the sitter's face and form, which shall express his character, individuality, spiritual self, instruction may be given of immeasurable benefit; it is urgently needed, and this need should be met."

Commenting on these remarks the editor of *Humphrey's Journal*, in which they appear, is somewhat severe on many of the transatlantic operators, as "men who have blundered into the business for the sake of getting a livelihood in an easy kind of way;" who have acquired their knowledge of the art "by enquiring of their brother operators, or of their stock dealer, or of their chemist; taking his time, and therefore his money, and making no compensation whatever for the same; actually *sponging* on the good nature of the man." The editior thinks that such schools would be a benefit if they could be established; but meanwhile the photographic journals, which form in his estimation a very efficient school, are least supported by those needing them most. "This journal," he remarks, "has articles in each number written by the leading and most scientific photographers in England and France, relating at length the results of long research and large experience; giving new formulas, and continually new discoveries, and your cheap picture taker thinks his business will scarcely afford it this year."

Mr. Root, in replying to these remarks, takes exception to the editor's view of the art, as one which may be picked up in the manner to which he refers; and urges that the establishment of a school would be beneficial to every photographer in the country, "including the teachers themselves, from the fact that the permanent presentation to the public of the definite idea of an institution, wherein the best possible instruction is given in all branches of the profession, tends naturally to produce improvement in all."

"It is an undeniable fact" he observes "regret it as we we may, that the majority of heliographers are deplorably wanting in many particulars which are essential to the production of life-like artistic pictures. Where are *our* Da Vincis, Michael Angelos, Raffaelles, Laurences, Stuarts, and Inmans in heliography?

"And why is our intrinsically noble art still regarded by the world at large as nothing other than a mere mechanical process? It were needless to say I am blaming my heliographic brethren herein, for you may 'count me in' with them in point of deficiences. But I speak of facts which appeal to us to adopt all means of improvement accessible to us.

"As to operators getting along by inquiring of their brother operators, or of their stock dealer, or of their chemist," Mr. Root remarks to the editor, "I think you must be 'poking fun' here. For to me it seems that Raffaelle might as properly have run over to Correggio's studio, to ask him how to arrange the halo around the virgin mother's head, or how to trace upon her forehead, eyes and mouth that mystic expression which blends the sentiment of veneration for the future divine Redeemer with the ordinary feeling of the loving mother towards that single infant in arms; and having got a verbal account of the mode of doing it, to run back and to finish off the immortally famous Madonna, as for a heliographer to step into a friend's, and having 'sponged' a little information out of him, to send home and by means of such information to make a passable heliograph! By your good leave, I should say you were altogether mistaken.

"Cycles of ages might elapse ere an operator could in this way learn to make a picture fit to be seen.

"I here refer of course to that department of the art comprised in the handling of the camera, in the chemical and manipulative departments very much, if not all, might be achieved by uninstructed industry and persistent experimentation; though even here an accomplished teacher may be of great service. Whereas in all that concerns the camera whereby the *soul* of the sitter is reduplicated on plate or paper, instruction by an artist of genius is valuable beyond measure.

"It is a common opinion I know, that anybody may learn to use the camera and make respectable heliographs. My opinion about this has been too often expressed to need repeating here.

"To save, however, the time and space which the consideration of particulars would cost, let me briefly state how I think a school could be instituted, and how it should proceed in its teachings. I would not have an isolated establishment, like a college or a nunnery, for the simple reason that subjects for practice would here be comparatively scanty, and the excitant interest of actual life would be wanting. But I would suggest something like the following.

"Let a heliographic establishment, in full practice and of good repute, having at the camera a genuine artist, at the head of the chemical department a thoroughly scientific and practical chemist, and elsewhere persons competent to touch up pictures, either with crayons, or oils, or water colours, be fixed upon as the school proposed. Let persons desirous to master the art be invited hither by advertisement.

"When the camera is in operation taking pictures for applicants, let the pupils be present and witness every part of the process, and hear from the operator the reason for every step he takes, *e. g.*, why the sitter is placed in a certain position; why the face is turned at a certain angle; why the light and shadows are made to fall thus and so; why the camera is placed at a particular height in relation to the face, etc., etc.

"When the picture passes to the chemical room let them gather about the chemist, see what he does and how he does it, and hear his reasons for doing as he does.

"In this way the pupils get theory and practice together, precisely as medical students do by accompanying the professor when administering medicines, and performing operations in an hospital. I need not enlarge on what can be done and taught in these departments, as my reader's own reflections will supply what is requisite.

"As an accompaniment to the school, I would suggest a weekly (or more frequent if thought best) assemblage of the pupils, when a lecture should be given to them on some particulars of the art, and a free familiar conference follow for the interchange of views."

The extent to which these extracts have run preclude further observations on the subject from ourselves; but we may remark in concluding, that whilst photographic societies and journals have in this country performed much of the work which our brethren in the States seem to require, we think that if the establishment of a School of Photography, with properly qualified teachers in all the departments, could be effected, in which students could graduate, and receive a diploma of qualification, it would materially tend to the improvement and elevation of the professional practice of the art. Whether such an institution could be best established in connexion with the Photographic Society, or in connection with some existing educational or art institution, or in connection with such an institution as the Crystal Palace, is a question which we may, at some future time, consider.

FROM A PHOTOGRAPHER'S COMMON-PLACE BOOK.*

To resume—pursuing our way, and crossing, on narrow "joggling" planks, no end of ditches and narrow brooks which intersected and ran in and out and round about in the most perplexing way, we got into some narrow shady lanes which soon assumed so amphibious a character that once or twice we thought progress would certainly end in their direction. However, by dint of a few more or less successful jumps, and a little skilful balancing on certain narrow lines of dry earth, formed by very deep cart ruts, we got over these difficulties tolerably well. I obtained here several of the foreground studies I have already acknowledged my partiality for securing.

One group, formed of small trees rising from an entangled mass of underwood, weeds, and creeping plants, with the long straggling arms of prickly bramble trailing prominently and intricately about all, was especially pleasing.

The fair companion of my ramble growing tired, I resigned all intention of that day seeking Richborough, and enquired for the nearest village, that of Ash; a little girl carefully bearing somebody's dinner to a neighbouring field described it as being about two miles off; just the distance the maiden of the ferry had said it was from the river. "Never mind," said I cheerfully, with a firm faith in the old song, which says—

> Jog on, jog on, the footpath way,
> And merrily hent the stile-a,
> Your merry heart goes all the day,
> Your sad tires in a mile-a."

In which, by-the-bye, there is, indeed, no end of wisdom, did we only apply it to this our toilsome path of life. Walking on some distance farther we met a chatty pair of good-natured dames returning from Ash, who in reply to our enquiry again replied, "Two miles sir," to which my poor little tired and hungry companion supplied a doleful echo. In about a quarter of an hour we met a man in a cart, accosting whom with the same question, we got the same reply, "Two miles sir." I remembered Southey's "Curse of Kehama," and began to think the village receded from our advance as the water did from Ladurlad.

At last we reached one of the most picturesque portions of the road, and saw the so-much-desired village close by on our left; and there, unkindly, ungallantly, selfishly, and without proper consideration, I detained M—— until I had got another negative. Upon my word I could not help it. The scenery was so thoroughly English, its beauty so great, the picturesque expression of the whole so happily secured by the combination of tender shadow and sunny light; and then there was no great patch of white sky to glare killingly out from my finished picture: and there was a capital boy driving cows who was perfectly willing to be bribed into a model. One of the cows being white and just in the right position, served to spread the light charmingly. A lovelier scene could not be imagined—I know it was wrong, but—well, all I can add is I could *not* help it. Ash is well worth a photographic visit if only to secure this one picture.

A lofty green vault of transparent leaves formed by the overhanging interlaced boughs, threw broad masses of soft, but clearly defined sun shadow over the nearer and farther portions of the narrow winding road. Gleams of golden radiance streamed slantingly in between the beautifully varied forms of the tree trunks, and came gliding through apertures in the sylvan roof, gilding some tiny eminences and hollows of the ground below, and bringing into strong relief a few drooping boughs and graceful weeds. The foreground was crowded with detail; a bramble bush half concealing a rustic stile, the gentle slope of a green bank, from the tall grass of which taller plants stood boldly up, and an army of field flowers peeping from verdant ambush at their feet, with a few large stones and dead sprays. The hedge-rows, luxuriant with creeping plants, hanging in festoons from the bending branches, or twisting snake-like among the diversified leaves, with long sprigs stretching out from denser portions against the faint leafy distance, the pale delicate shadows and soft lights of which gave it a most fairy-like character, as it lay sleepily reposing in the warm flood of sunlight, beneath the bright blue sky and its cloud mountains of sun-irradiated snow. Very little of this however, appeared on the ground glass from the point of view I had chosen, which lay somewhat to the left. Oh! that such a sky could be photographed without the landscape suffering from the inkiness of under exposure! The collodion I was using being just the thing for foliage, and the amount of contrast not being so great as to involve any particular sacrifice of the one part for the better development of another, I had strong hopes of securing excellent results. My only fear came when I looked at that green roof, the light forcing its way through certainly partially illumined it, but then its colour and the amount of gloom—well, thought I, there is not much of it in the view I have, and here goes to decide.

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* Continued from p. 256.

So I plunged my head and arms into the dark tent and soon emerged with the slide, popped it into the camera, took off the cap, solemnly counted out the exposure, shut up the slide, conveyed it and myself once more into the dark, and—Oh! horror of horrors!!! Conceive my feelings—my developer was nil—gone—left behind—far far away, reposing securely with those blessed barns, and their bothering breadth of effect—there; pray don't laugh! don't!!

* * * * * *

Crossing a hop-field to the left, in a very unpromising condition for its proprietor, we saw the village church before us, with its steeple gaily decorated with flags, and descending a gentle declivity and crossing a stile we directly afterwards entered the village.

Ash is about three miles from Sandwich, which is seven miles from Ramsgate. Reaching Sandwich by rail you may find the walk to Ash a very pleasant one, and pick up some pretty views on the road; beside which, Richborough is not far off. Mr. Gough* stated that in 1737, in a sandy field at this place, were found a group of wooden cases containing several bodies lying with a spear on their one side, and a sword on the other, the sword being most frequently on the right side; glass and amber beads, strung alternately together, were about the necks; the fibula on the shoulder; and the iron umbo of a wooden shield, of about eighteen inches diameter, directly over their faces. Several medals, and numerous other interesting relics, before and afterwards discovered, seemed to point out this field as a place of Roman sepulture, connected, doubtless, with that gigantic remnant of our earliest history, Richborough Castle.

Truly the scene was a pleasant one as we entered the picturesque, old-fashioned little place, and looked wonderingly about us. There was evidently something out of the common which had disturbed its usual dull and even monotony; flags floated from nearly every window in the place, flowers and evergreens hung festooned from house to house, all the villagers seemed to be in their best attire, and each to be congratuling each with smiles full of pleasant significance. The numerous flags were very varied in their character, some being old fashioned election banners which must have been in existence according to the inscriptions they bore for very many years, others were composed of fragmentary and rotten bunting, of which, judging by appearances, each might have been the veritable "flag that braved a thousand years, the battle and the breeze," others again shone in the resplendent newness of glazed calico, and some were mere cotton handkerchiefs dignified with the royal arms of England and stuck at the end of long, white wands, wreathed with leaves and flowers. Triumphal arches of a very picturesque character abounded, wreaths and bouquets of flowers seemed stuck about here, there, and everywhere. An oasis of social pleasure, merriment, and happiness had evidently sprung up in the unvarying everyday desert of village life. Sounds of festivity came from the humble inns, all the little houses appeared to be full of cheerfully gossiping neighbours and friends; and hardly one—if one of them—was without its outward sign of holiday-making joy.

Of course we wondered what important occasion had called forth this unusual display, but being anxious for food and rest we entered what appeared to be the principal inn, and being shown into a small room, a perfect specimen of scrupulous cleanliness and neatness, we sat ourselves down in the old-fashioned wooden chairs, and demanding refreshments, made our enquiries immediately after. The hostess, a cheerful, motherly dame, told us in reply that a certain magistrate,—whose name I think she said was Godfrey—reverenced and beloved by the villagers for his native goodness of heart, generosity, and kindness to the poor, had that morning given his youngest daughter away in marriage, and the inhabitants, rejoicing in the opportunity of expressing how heartily and thoroughly they appreciated these noble qualities in a superior, had exerted themselves to do honour to the occasion. This explained the words "the poor man's friend," which some of the larger banners bore. I felt my heart warm towards the little place for its demonstrative gratitude and love, and I envied that certain magistrate the feelings with which he must have witnessed such a genuine outburst of pure esteem and affection. After a due modicum of refreshment and rest we walked out again. The church in which the ceremony had been performed, and for which floated from its steeple the flag before referred to, stood beside the single street of the village upon a slight eminence. The iron gates were converted into the prettiest of flower-decked bowers, and the path through the churchyard was still strewn with the flowers which had been scattered before the happy bridal party. We soon found that apart from the village itself many spots in its vicinity would make excellent photographs.

As the evening came on and just as we had sat down to some tea in the aforesaid little room, there came into the village with a clanking rattle and jolting swing a certain crazy, shabby, old box on wheels, capable of accommodating as many as four persons, and called "the omnibus," which ran once a day between Canterbury and Sandwich. Packing ourselves into which we were conveyed to the place last named. The sun had gone down, little sparkling lights glimmered here and there over the widely-spread country stretched gloomily out in a shroud of thick, grey mist, and a drizzling uncomfortable shower fell noiselessly down into the dark foliage among which a low-voiced wind went moaningly. So—as we rode home in the railway train—I first began to contrast the gloomy cheerlessness of this scene with the sunny joyousness of that presented by the homely village just quitted, and then began to link the two together in a dream of life's vicissitudes, with which came trooping the bride and bridegroom I had never seen; the "poor man's friend," the dear little girl beside me, and the echoes of my own past life—hallo! why, where am I going to? this is not by any means photographic, and I've already got to the end of my present tether. Beg pardon. Adieu. A. H. W.

(*To be continued.*)

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* In his Additions to Camden.

ON THE ACTION OF LIGHT UPON OPTICAL GLASSES.

BY A. GAUDIN.

Light, as we have before stated, traverses all bodies, with the exception of the metals, or rather, bodies that have a metallic reflection; for carbon, or coal, does not pass for a metal; but in its metalloid state having a white metallic reflection like silver, it is opaque. In the state of lamp-black it transmits red rays, while it is blue by reflection, as is seen in smoke, which makes the sun appear red when viewed through it, and this smoke appears blueish when lighted by the sun. A smoked glass produces exactly the same effect as the lamp-black deposited either on its surface or intimately mixed with the mass of the glass.

We will first take into account the nature of glass. Glass derives its usefulness from its chemical nature and from its physical properties. In chemistry we know many vitrifiable bodies which form the base of glass; they are acids, which retain their limpidity in melting, and become viscid on cooling, so as to admit of being drawn into very fine threads. Such are silica, or silicic acid, barytic and phosphoric acids; the two latter are very fusible, they are soluble in water, even after being melted, while silicic acid, which melts only with the aid of oxygen, at a white heat, entirely resists all atmospheric agents.

Besides its superiority in this respect, silica obtains the preference in making glass, on account of its trifling value, being profusely scattered everywhere, so much so, as to form one of the principal ingredients of the earth.

Moreover, silica is found in immense deposits in a state of almost absolute purity. Generally, siliceous matters are purer than they appear to be; sands which appear ferruginous, are so only on the surface, acids dissolve the iron and the sand remains white. Silex, black, red or any other colour, derives this colour from organic matters which are dissipated in the fire; calcined flint is as white as satin; cornelian, all the variegated agates, red and green jaspers, submitted to the oxyhydrogen blow-pipe, swell and become bulky, and leave a button which resembles in some respects the white of eggs, beaten to a froth. Only rock-crystal in needles retains its perfect transparency after fusion, it is the only natural body which enjoys this property.

Rock-crystal in a state of fusion, is always viscid, it can be drawn into threads as fine as cobwebs, and cooling does not alter its limpidity.

On this account melted rock-crystal is of itself *perfect glass;* but its infusibility in ordinary furnaces prevents its being used except in very small portions.

Foz this glass contains another element, necessary to secure its fusibility, without impairing its transparency: this new ingredient is an oxide—potassa, soda, lime, barytes, oxides of lead or zinc, &c.

Glass is therefore a silicate, to which oxide of barium is sometimes added; but phosphoric acid, like stannic acid, or oxide of tin, renders the glass opaline, on that account they serve to produce enamels.

Some chemists have desired to find silicates in the composition of glasses; but their calculations were false, for they ignored the formula of the silica itself, and in fact, the best glass will always be a mixture of silicates, especially to resist devitrification, which is the negation of glass.

In fact, glass submitted to a very slow cooling always exhibits nests of crystals disseminated in its mass, and certain kinds of bottle-glass present in this case an opaque mass similar to certain igneous rocks, which, originally vitrified, owe their actual texture to slow cooling.

This glass is chiefly composed of silicates with the addition of an oxide to assist its fusibility; the whole melted and perfectly mixed, so as to obviate crystallization, and to present a uniform density throughout its mass.

Homogeneity is the most desirable condition in glass for optical purposes; it is also the most difficult to attain. The process that most nearly secures this end is a continuous stirring of the glass at the time when partial cooling has brought it to the pasty state. This process, invented by Guinard, was a great progress, but the requirements of optics necessitate that we should knead glass as we knead metals: for in a large mass of glass we can always perceive striæ due to a difference in density in certain portions, and as in the thickness of half an inch it may occur a hundred thousand times, we may at once understand how perfect the medium must be for the optical effect to be satisfactory.

Melted rock-crystal is always perfectly homogeneous, because it consists of a single molecule; thus, an experienced optician to whom I gave some plates to cut, expressed his astonishment at the beauty of this material; in fact the finest glass is wavy in comparison.

He cut me a lens of rock-crystal perpendicular to its axis, and non-achromatic, to try its photographic qualities. It gave me pictures of exquisite purity; I was not astonished, for in photography achromatism is of no great consequence, since the principal action proceeds from the chemical rays, and to succeed well we must in some measure dispense with achromatism.

(*To be continued.*)

SCIENTIFIC GOSSIP.

A brief account of Professor Way's electric light was given in a recent number of the Photographic News (No. 106, p. 230), and from the interest which was created by our notes on the subject we think our readers will be pleased to know the results of some investigations on the subject of the mercury light in its relation to colour and photographic effect, which Mr. Crookes has recently made known. The light which is obtained from the fluid mercury poles in Professor Way's arrangement is of a very peculiar character, unlike the ordinary electric light, which, as our readers are aware, is produced between two carbon poles, and contains at least as many different coloured rays as sunlight itself, the mercurial light consists of only six definite homogeneous colours, each occupying a particular space in the solar spectrum, and having wide black intervals between them. The carbon electric light will thus illuminate any object with the exact colour which it is best able to reflect; but with the mercury light it is Hobson's choice, the object must either reflect one of the six colours evolved by the light, or it must remain in darkness. These colours are as follows:—First, at the lowest end of the spectrum comes a brick red tint, next to this is a strong yellowish orange, then two emerald green colours nearly touching; after these, and at some distance off, is a rich ultramarine blue, and lastly a violet. So far relates to colour, but the rays evolved from the luminous mercury do not end here. Beyond the violet is another intensely energetic ray, but which, to be rendered apparent to the limited range of the eye, must be received upon some fluorescent screen, such as a piece of paper washed over with a solution of sulphate of quinine, or allowed to fall on a sensitive collodion plate. This latter surface makes known to us some other interesting properties of this light. Not only will this invisible ray impress itself strongly upon the plate, but the last two visible colours, viz., the rich ultramarine blue and the violet are also seen to rival it in photographic action. If (as has been done by Mr. Crookes) a more complicated arrangement be employed, and the light be decomposed and refracted into its component parts and thrown upon the collodion plate without having passed through glass at all, as may be effected by having the prisms and lenses cut from pure rock crystal, further remarkable results are obtained. Beyond this one invisible chemical ray, are seen others equally energetic in their actinic power, and mounting higher and higher into the almost unknown regions of this invisible and mysterious part of the spectrum. The mercurial electric light thus appears to be almost unique in its properties, unlike other artificial lights it is pre-eminently distinguished by the intensity and number of its photographic rays, and although in its present state it will scarcely do for private or general purposes of house illumination, there is no reason why it may not become at once available for photographers. The reasons which will prevent it coming at present into general use are obvious from the above. Let any one imagine an assembly being illuminated with a light which is deficient in 94 per cent. of those coloured rays which are usually met with in sunlight. Only those colours would be visible which were capable of reflecting the identical ray of the spectrum contained in the mercury light, and everything else, of whatever colour it might be by daylight, would be totally black. Instead of having a thousand varied hues and tints to rest the eye upon, we should be limited to the six colours named above, and their combinations; and any one who has considered for a moment how intimately any system of internal illumination depends for its success upon the facility of reflecting and showing up varieties of colours and tints, will at once see that a source of light, however brilliant and valuable, could scarcely meet with private or public approbation if it were so signally deficient. n discrimination as to transform the warm glow of health on a fair girl's cheek, to the ghastly and cadaverous hue of death. Whilst raising these objections against the mercurial light for private or domestic purposes of illumination, we cannot but think that for photographic purposes it would be invaluable. Containing as it does so many and intense photographic rays, and having such advantages over the ordinary form of electric lamp, we await with impatience the further developments and improvements which will be necessary before it can be brought before the public.

Mr. E. J. Asser of Amsterdam has recently taken out an important patent for the production of "Photographic proofs with printing or autographic ink, for the purpose of either using them as such, or placing them back on lithographic stones or on metal." In carrying out this invention the patentee takes paper prepared without size, and steeps it in a solution of bichromate of potash. He then dries it in the dark, and by a negative on glass, or other transparent negative, placed in an ordinary frame, and exposed to the light with the paper prepared as above described, he transfers the image to the paper. After the impression has thus been obtained he dissolves the unaffected portion of the bichromate of potash in water, and after perfectly drying the paper bearing the impression, he wets it on the back and places it upon a sheet of unsized paper, damped and stretched upon a glass or other flat and hard object, the impression being uppermost. He then passes over it a roller charged with printing ink, until the impression shows well in black. He then steeps the impression in water containing a little nitric or other acid, which will dissolve the bichromate of potash still upon the positive, and remove it from the paper. After drying, the positive is ready. The theory of the process is as near as can be to that of lithography, that is to say, it is based upon the principle that water will not adhere to paper or other substance previously combined with an oily or fatty matter. The unsized sheet of paper may be coated with starch previous to its immersion in the bichromate of potash, as much to prevent any roughening of the surface of the paper as to facilitate the transfer. By passing a roller charged with autographic ink over the impression obtained by bichromate of potash and treated as above described, a stereotype is obtained which is suitable for transfer by pressure on to a lithographic stone, from which it may be printed off in the ordinary manner. This transfer may be made in like manner upon any of the matters which may be used on the same principle for every description of autographic printing, as for example zinc or copper, either by the process termed zincography or galvanoplastic. The inking can also be effected in some cases with a rubber instead of a roller. The above is an abstract of the specification; the original is very obscurely worded in some parts and contains little or nothing which has not been known before. It will not be published for some weeks. When the complete document is before us we may perhaps return again to it if there are any points of interest in it which are not embraced by this abstract.

A patent has also been taken out by Mr. P. H. Desvignes for "apparatuses for exhibiting photographic, stereoscopic, and other pictures, models, figures, and designs." The object of this invention is to show in one apparatus a series of stereoscopic or other representations or models taken on different lenses, as if the scene or the things represented were in motion. The apparatus is cylindrical, and the cylinders are caused to rotate either vertically or horizontally. To exhibit stereoscopic views the patentee takes a cylinder and sets it vertically. In the interior, in suitable frames provided for the purpose, he places, say six, but there may be more or less stereoscopic slides; the periphery of the cylinder has formed across it as many slots as there are sets of slides. One or more glasses for viewing the pictures are supported and held stationary outside the periphery of the cylinder, or may be otherwise placed. The views may represent for instance a steam engine, and each view must be taken when the engine is at different parts of its stroke. The views being placed in the said cylinder, and the cylinder being caused to rotate, will show to the eye the steam engine as if in actual motion. The slides may be transparent or opaque. For exhibiting some models and drawings he arranges them round a cylinder placed and caused to rotate horizontally. Vertical slots are made in the periphery, through which to see the models and drawings. The patentee has included many modifications of these arrangements in his patent.

Dictionary of Photography.*

Printing—*continued.*—The next step is to render the albumenized paper sensitive to the action of light. The bath of nitrate of silver for this purpose should be strong in proportion as the paper is highly salted; as in order to produce a vigorous print the surface of the paper should contain a full proportion of chloride of silver with nitrate of silver in excess. The strength of nitrate of silver should never be less than sixty grains to the ounce of water, otherwise the image will be flat and poor in tone. In our own practice we usually prepare a bath with eighty grains of silver to an ounce of distilled water. The strength of the bath is impaired with every sheet of paper excited; but by keeping it replenished from a stock bottle, containing eighty grains to the ounce, the strength will rarely fall below sixty grains to the ounce. If any doubt exist on this subject it is better to ascertain the strength by the use of a silver meter. Some photographers add acetic acid, about eight or ten drops to each ounce of solution, and others nitric acid about one drop. The writer has not found this necessary in practice when using crystallized nitrate of silver.

The solution should be poured into a clean, flat, porcelain or glass dish, which should be kept strictly for this purpose, to the depth of not less than the third of an inch. The sheets should be placed on the surface, taking care to avoid air-bubbles, and to allow the surface to come into contact with the solution steadily and regularly, or there is danger that lines will be formed. From three to five minutes is usually sufficient time for the floating; but this will somewhat depend upon the kind of paper used, as a horny and highly albumenized paper will require a longer time than a thin, absorbent, slightly albumenized paper. A paper of the latter class will be very likely, if floated too long, to give a dull woolly looking print, from the silver being thoroughly in the texture instead of on the surface. On removing, it should be hung up by the corner to dry in the dark, in a warm room. A piece of blotting-paper attached to the bottom corner prevents a stain by the accumulation of silver at that part of the sheet.

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* Continued from p. 260

The bath of nitrate of silver will become, after being in use a short time, discoloured by the contact with organic matter. A slight amount of discoloration will not affect the colour of the print: but it is better now and then to remove the colour by filtration through kaolin or china clay, which will restore its original purity. Animal charcoal has sometimes been used for the purpose, and also fuller's earth. Neither of these substances can, however, be used with perfect safety; kaolin is the proper agent for the purpose.

The paper should be used as soon as possible after exciting, to secure the best results. Various contrivances have been tried to keep the paper ready excited without the discoloration which usually ensues within twenty-four hours of the sensitizing; and whilst many of these have been found successful in a greater or less degree, it is generally found that the toning is difficult and imperfect, unless the paper be printed and toned within a few hours of its preparation with silver. The paper should be dry, however, before using in the pressure frame, or both the print and the negative, especially if the latter be unvarnished, will suffer. If the strength of the salting and silver baths be sufficient, and the negative a moderately good one, the deepest shadows will readily bronze, whilst the highest points of light will be preserved, and thus ensure a rich, vigorous effect in the finished print. The amount of printing necessary will much depend on the negative and the subject, and must be determined by the judgment of the operator; but under ordinary circumstances it will be found that the highest lights should just have changed to a pale lavender, to secure the best results in toning. This amount of colour will be removed by the toning and fixing processes, and leave the lights a pure white. We are now, of course, referring to the method of toning and fixing when using the alkaline gold bath. If the negative be very vigorous and dense, strong sunlight is best for the printing; if, on the contrary, the negative be weak, a soft diffused light is desirable for producing a vigorous print. A negative of the latter class may, if many prints are not required, be used unvarnished, and more brilliant results be often obtained; a dense negative, on the other hand, will give softer pictures and more detail if varnished with a strong-bodied spirit varnish, which will slightly lower its intensity. In fixing the sensitive paper on the negative in the pressure frame, care should be taken that the contact is perfect throughout, so as to secure sharpness, and that in lifting one half of the back of the pressure frame, the other half has sufficiently firm pressure to prevent the paper being moved, and so causing a blurred impression. Sometimes a good effect is produced by adjusting a thinly spread layer of cotton wool at the back of the paper, over the face, so as to secure firmer contact, and consequently greater sharpness at that point.

In this part of the process some operators employ " masking," or stopping out by shields of paper laid on the outside glass of the pressure-frame, various parts of the picture. The cut out or " French background is so produced, the background being masked during the printing of the figure, and the figure being masked during the printing of the background. We have never seen a picture so printed that had not a hard, inartistic outline; and do not recommend the practice of masking so applied. The principle may, however, be often used with success when judiciously applied to stop out certain parts which would get overdone whilst the remainder obtained due exposure. Where masking is resorted to, the parts to be stopped out should be covered up at the commencement of the printing, and when the parts requiring extra light have been exposed some time the stopped out portions may then be uncovered. The advantage of this mode of proceeding is that any hard edge which had been formed will now be printed out or softened down by the subsequent exposure of all together, as a painter would soften down a crude outline. Much may be done in the production of artistic printing by the judicious use of stopping out, and glazing or toning down, as Mr. Rejlander describes, with his " pencil of light."

The principle of vignetting is but a further application of the idea of stopping out. It may be effected in various ways; but in all cases, to secure the best results will require time and attention, and any contrivance intended to dispense with these must involve a sacrifice of results. Vignette glasses, however well made, give a uniform regular form, alike for every figure and every position. If they are used at all, the liberal use of cotton wool is also desirable to modify the effect and produce the irregular unmechanical softening into the back ground, suited to each especial picture, which is desirable to artistic effect. A piece of card with an irregular opening, or a broken passe-partout, with the additional use of wool, and repeated change of position in the masking material, no matter what it may be, will generally produce good results.

The prints, when sufficiently exposed should be stored away in the dark until the day's quantity is printed, and then the superfluous edges being clipped off, the whole should be placed in a clean dish and soaked for a while in clean common water, which should be saved, and the silver it will contain thrown down as a chloride by means of common salt. A few changes of water during the course of an hour will be sufficient, and the prints may then be removed to the toning bath. Some operators add a little common salt to the last water, but if they have been well washed that is not absolutely necessary.

The greatest care should be used not to touch the prints with fingers which have come into contact with the minutest portion of hypo, nor to place them in a dish which has ever contained hypo. Stains are a common result of want of caution in this respect.

(*To be continued.*)

THE ADAPTATION OF MACHINERY TO PHOTOGRAPHY.*

BY G. H. BABCOCK.

In this age of steam, telegraphs, and photography, when the three most subtle agencies of nature—light, heat, and electricity—have been subdued by man and trained to do his bidding, startling developments and astounding applications in art and science are looked for as an almost daily programme in the great drama. Is it then to be wondered at that the go-ahead Yankee, in his impatience at the slowness of this " fast " age, should conceive and actually carry out the idea of applying steam power to the production of photographs and should turn them out at a speed which eclipses the boasted rapidity of the " lightning " printing-press?

As an evidence that this may be and even has been accomplished, I have the pleasure of presenting for the inspection of the society, this evening, several specimens, among them a sheet containing about three hundred photographs all printed from one negative, at the rate of *twelve thousand an hour!* As astonishing as this speed may seem, I am assured, and from what I have seen, believe, that it may be greatly increased.

The means by which this is accomplished is, simply the adaption of machinery to the process of printing by development. This process, though little used of late, has certainly produced some very fine specimens, and prints so produced are generally conceded to have the advantage in permanency over the ordinary prints produced by the direct action of light.

The machine is the invention of Mr. Charles Fontayne, of Cincinnati, Ohio, who has spent several years in perfecting it, and the developing process which he uses therewith. I am assured by him that the process by which these specimens were produced is quite different from any other known; but in what this difference consists I am not informed. A negative is fixed in a box, together with a sheet of prepared paper, and the latter exposed by automatic machinery to the condensed light of the sun passing through the negative. After each exposure the paper is traversed underneath the negative, to present a fresh surface for the succeeding impression. These motions, together with that of clamping the negative into close contact with the paper at the instant of exposure, are all performed by the operator simply turning a crank.

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* Read before the American Photographical Society, Aug 13, 1860.

The rapidity, at the several times I witnessed its operation, was two hundred impressions per minute, at which speed the time of exposure was but ·03 of a second for each impression. The condensing lens being seven inches in diameter, and the circle of condensed light about one and a half inch, the above exposure is equal to ·65 of a second direct exposure to the light of the sun. If, therefore, the machine were to be used for a larger class of pictures, such as book illustrations and stereograms, a condensing lens might be dispensed with, and yet nearly twenty-five hundred impressions be taken in an hour.

This opens a field for photography hitherto impracticable in consequence of the time and expense of printing as ordinarily practised. The illustrations for a book, having all the exquisite beauty and perfection of the photograph, may be turned out, by the use of this machine, with a rapidity wholly undreamed of, either in plate printing or lithography. The expense of engraving may be dispensed with, and the negative come direct from the artist's hands, drawn upon a prepared glass from which, in the course of a few hours, the plates for a large edition may be printed, each one a perfect duplicate of the original drawing. As an evidence of the facility with which this may be done, a print produced by the ordinary ammonia-nitrate process, from a rough sketch so prepared, is herewith presented. It will be seen that an ease, freedom, and spirit is given to the drawing which cannot be equalled by any process of engraving, and when the negative is properly prepared by an experienced artist, nothing further could be desired for illustrating ideal subjects; but for the actual, and for reproducing the works of others, of course, the draughtsman would give way to the far more truthful camera.

But besides book illustrations and portraits for visiting cards, and advertising purposes, of which specimens are shown, this machine may be applied to the multiplication of stereograms, which, by its use, may be made so cheaply as to bring them into the humblest family, where by their exquisite beauty and truthfulness they will engender a taste for the beautiful and, in time, entirely eradicate the cheap and disgustingly coarse lithographs, engravings, and water-colour daubs, which at present form so large a proportion of the pictures within reach of the poor.

When these new adaptations of photography shall have been fully accomplished, then shall our noble art, which has already done more to develop and elevate the taste of the present generation than any other one instrumentality, take a stand by the side of its great sister art—Printing—and, hand in hand, will they go forth to educate, ennoble, and elevate mankind.

The pictures herewith presented possess additional interest to this society, from the fact that they are taken upon ordinary American writing paper, which was not prepared specially for photographic purposes. Mr. Fontayne first used this paper in his experiments on account of it's cheapness, and, having become accustomed to it, he now prefers it to any of the foreign photographic papers. In the course of his extended experiments, he has used almost every variety of American paper, including that made from straw, manilla and cane, with varying degrees of success, and he promises at some future time to present the result of these experiments to this society.

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 3rd *October*, 1860.

I read in a Belgian newspaper, the *Précurseur d'Anvers*, what may be considered as "a startling announcement," in the shape of a new application of photography discovered by an eminent sculptor whose modesty forbids him to proclaim his name to the world. I cannot give you the particulars of this new method or process, for it does not appear to have been yet divulged, but what it promises to achieve for us is nothing less than this:—by a quick and inexpensive process to take pictures of models for the sculptor, living or inanimate. They can be produced of large dimensions, and increased or diminished at pleasure, in full relief or in bas-relief; we are also assured that the resemblance to the original is strictly correct, and that all these important results can be obtained at the hands of an ordinary workman. There is just enough said to exite vague speculations and tantalize the reader; it is to be hoped that further details will soon be vouchsafed to us.

Mr. Goldschmidt has discovered a new planet in the constellation Aquarius, it is of the eleventh magnitude; the name proposed for it is *Danæ*.

It has recently been discovered that wheat flour can be converted into gum or dextrine by acting upon it with lactic acid or whey. The product is almost colourless when 272 parts of whey are added to 100 parts of flour, and the mixture passed through a fine sieve; it is brown, however, if only 125 parts of whey are employed.

Among the recent applications of electro-metallurgy we may instance the happy idea of Mr. Gaudin in employing it in the setting of jewels. This is a very delicate and expensive branch of the art of jewellery, and so difficult that the setting of a jewel can seldom be fully relied upon.

The inventor first takes a mould in wax of the ornament that is to receive the jewels, then places on it, at the proper points, the jewels, embedded in the wax to a sufficient depth; the wax model, rendered a conductor of electricity, is placed in the gold solution, and the metal deposited upon it. When the deposit is completed, the jewel is found firmly enchased in the metal, from which, if the process has been properly conducted, it will be impossible for the jewel to escape. The saving of time effected by this process is also very considerable. By the ordinary process a jeweller can scarcely set 60 jewels in a day, but by the new process as many as 1500 to 2000.

The experiments of Lichtenberg have shown that when after electrifying an electrophorous, or cake of rosin, we project a non-conducting powder on its surface, the figure in which this powder arranges itself varies with the nature of the electricity communicated to the plate. If the electricity communicated be positive, it arranges itself in divergent rays; and in rounded contours if the electricity communicated be negative. This essential difference in the figures of Lichtenberg has not yet received a satisfactory explanation; Reutlinger of Vienna has recently undertaken its study, and his conclusions should command immediate attention. By substituting a Ruhmkorff's inductive apparatus for the ordinary electrical machine, he has repeated the experiments of Lichtenberg, amid recipients placed in a vacuum; he has in this manner shown that the extent of the figures augments with the degree of rarefaction of the air, and that, consequently, the ambient air exercises a very marked influence upon them. When the atmosphere is replaced by hydrogen, the figures become much more varied and complex, and everything induces us to believe that these figures are material representations of the motion of the molecules or electric atoms. Adopting the opinion of M. Plucker, that the electric molecules of the positive pole have a peculiar motion of translation in the direction of the current, while the negative pole has no tendency to motion. Mr. Reutlinger expresses himself as follows:—the positive molecules endowed with a peculiar motion proceeding from the conducting point on the surface of the electrophorous, follow an oblique direction, conformably to the laws of the decomposition of forces, and gliding over the resinous surface, are scattered from the conducting pointlike rays starting from a common centre. The negative molecules, deprived of motion, group themselves in a circle, the centre of which will be the conducting point.

Dr. Mach, by the aid of a rotary apparatus, expressly constructed for the purpose, has repeated the experiments of Doppler and Fizeau on the modifications in tone and hue, which a rapid motion, either of the observer or of the sonorous or luminous source, effects upon sounds or colours. He believes he has demonstrated:—1st. that motion modifies the tone of the sound according to the theory of Doppler; 2nd, that the approximative value of the modified sound agrees very well with that deduced from the formulæ of Doppler; 3rd, that colours exhibit analogous phenomena, and that the study of these phenomena may serve to explain the relative motion of the stars, the colour and luminous intensity of which are subject to periodical changes.

The remarkable number of suicides that have taken place lately has greatly occupied the attention of psychologists and physiologists. M. Bierre de Boismont has lately read an essay upon general paralysis and its premonitory symptoms. The symptom to which he attaches most importance is, a complete change in the habits and character of the person attacked. When an individual who, naturally gentle and patient, becomes subject to fits of violent anger, or a person sincerely Christian, and of pure morals, assumes a strange liberty of thought and manners, we shall not once in a hundred times deceive ourselves if we take these symptoms as prognostics of a disorder of the brain, which will soon degenerate into general paralysis.

Lœwel, by his beautiful experiments upon the super-saturation of saline liquors, has shown that when a current of atmospheric air is passed into a supersaturated solution of sulphate of potassa, the liquor crystallizes, but if the air be previously passed through cotton, the crystallization will not take place, but if we remove the cotton while the experiment is going on, the liquid will immediately crystallize.

The crystallization of supersaturated solutions, when ordinary air is passed into them, has been attributed to the presence of solid matters held in suspension in the atmospheric air, and that the filtration of the air through cotton or other substance in a finely divided condition, which may retain these solid matters, appears to fully explain the phenomena of non-crystallization which is almost always produced when we operate under these conditions.

Still the experiments about to be described prove that the true causes which determine the crystallization of supersaturated liquors, and especially those which prevent this crystallization, are not yet well known.

When the experiments of Lœwel are repeated several times, it is often observed that the solutions crystallize when the air is filtered through cotton.

It also happens, that when the liquor does not crystallize, and that the cotton is removed while the air continues to pass, the liquid remains limpid as long as the atmospheric air is passed into it, and if the liquid be agitated we observe that it offers much resistance to crystallization.

If it be heated to 100° or 120° F., before the experiment, and the extremity of the tube which is immersed in the liquid be afterwards allowed to cool, crystallization does not take place, although the air be not passed through cotton. This last experiment evidently proves that there exists unknown causes which determine or prevent the crystallization of supersaturated solutions. An electric current appears to have no action upon supersaturated saline solution; the liquid crystallizes in contact with plates of platinum serving as conductors, but the crystallization does not always take place when we previously heat the platinum plates, and allow them to cool, sheltered from a current of air.

From some very interesting experiments made by Professor L. Vella of Turin, we are led to conclude that the poison *curare* is an antidote to strychnine. That a mixture of these two deadly poisons so far from increasing in virulence becomes innocuous, and may be administered to animals with impunity.

Signor Vella was led to try this experiment by considering the property possessed by curare of paralysing the motor nerves, and to apply it to the cure of tetanus, a disorder essentially convulsive.

Curare completely destroys the effects of a dose of strychnine, which is mortal when administered either by the stomach or by injection, or injected into the veins. In a physiological point of view this fact is important, for it serves as a scientific basis to all the applications of curare that can be made in therapeutics.

There is a very common disease of the gums which has seldom been described, but which from the constant pain and annoyance it causes to those who are afflicted with it, especially during meals, is deserving of more consideration at the hand of the surgeon than it appears to have met with. It is always a cause of fœtid breath and occasions the loss of the teeth, which although sound, are expelled from the gums. This infirmity is the cause of much discomfort to those afflicted with it. It assumes a variety of forms; it is generally suppurating, frequently ulcerous, sometimes fungous, at others simple. It is considered as an hereditary disease, a form of scurvy perhaps; it arises from inhabiting a cold wet climate, or from accumulation of tartar around the teeth: from a bad condition of the stomach and digestive organs, resulting from overfeeding. M. Marchal of Calvi, has treated this disease by the topical application of aqueous solutions of iodine, at first very weak, and gradually increased in strength. This therapeutic agent appears to act as a specific.

The remains of another gigantic antediluvian animal have been discovered by M. Papkow, near Nikolaïef, in Russia. From a photograph I have seen, I have no hesitation in pronouncing it to be a mastodon. The extremity of the lower jaw, about ten inches in length, is formed like a beak. The molar teeth of the lower jaw are in a good state of preservation, they are gibbous, and composed of parallel striæ or plates. No remains of the mastodon so considerable as these have been found hitherto in Europe. They consist of the anterior portion of the cranium with its defences, (nearly six feet in length), the lower jaw, vertebræ, ribs, part of the bones of one of the fore feet, and other fragments.

Photographs on Ivory.

Sir,—Will you allow me to correct, or rather, more fully to explain, a remark appended to my name in your excellent report of the conversational discussion at the North London Society, which, by the way, from its desultory and multifarious mingling of topics must sorely have tried the organ of "concentrativeness" in the reporter. My allusion to the specimens of ivory printing I had received from Messrs. Beard and Sharp's, are given without the qualifying clause, that I had seen some very excellent photographs on ivory produced by those gentlemen; and the inferiority of those I had received, merely proved the uncertainty of the process, even in hands so experienced and qualified.—Yours, dear sir, very truly, Alfred H. Wall.

P.S.—I fear I must have been either very indistinct in my utterances, or very unfortunate, on the occasion alluded to, as I am made in the report of the proceedings which appeared in a contemporary to state that ivory "was not to be compared to paper" for photographs; an opinion the opposite to that which I hold, and expressed. As an artist I should regard a successful and certain method of printing on ivory, of the utmost importance to the production of first class coloured photographic miniatures; and look forward with considerable interest to see or hear something more of the method to which Mr. Cramb referred, at the meeting in question.

Exchange Club.

Sir,—Your invitation to readers of the News to send any suggestion that may occur to them concerning the rules of the "Stereo. Exchange Club, induces me to trouble you with the following:—

That prints sent unmounted be invariably marked right and left, great inconvenience arising from such omission.

That not more than four prints be sent under one cover, the receipt of four or five communications in the week, each containing six, eight, or twelve prints, tend rather to make a toil of pleasure in answering so many correspondents.

That the rule be imperatively acted upon that no name be inserted in the list if the specimen sent is not up to the mark; the with-holding such name will be a hint better than all complaints.

Any attempt to divide members, specimens into first, second, and third class would be so invidious a task t'were better left alone.

A great deal must always depend on the courtesy of the members themselves, but I think that what under the existing rules has been a great source of pleasure to many will with increased numbers go on swimmingly under your kind surveillance.—Yours, &c. STEREO. EX.

PHOTOGRAPHY AT SOUTH KENSINGTON MUSEUM.*

JOHN SCOTT, ESQ.; examination continued.

"865. (*Chairman.*] Will you proceed with the statement which you were about to make with regard to photographs of the cartoons of Raffaelle?—I would first state, being M. Caldesi's partner, the circumstances which led him to wish to undertake the photographing of the cartoons. About 1850 M. Caldesi came to England, and, as most intelligent Italians do, he went to see the cartoons at Hampton Court, and conceived a great wish to photograph them. Mr. Craufurd, the Honourable Member for Ayr, applied to the Board of Works in August 1854, requesting that the Government would grant permission to Mr. Caldesi to photograph them. On the 11th of August of the same year, Mr Phillips, the then Secretary to the Board of Works, replied that the Government did not like to undertake the responsibility of moving the cartoons. I state this, because a personal element has been introduced into this matter, upon which a great deal turns. Mr. Thurston Thompson mentioned to me, early in the year 1857, that he intended to photograph the cartoons; and he afterwards asserted that I had betrayed his intention to Mr. Caldesi. In 1856, Signor Caldesi was thrown into communication with Sir Benjamin Hall, when Sir Benjamin Hall gave a quasi promise that the thing should be done. In January 1857, I, having for a long time seen the growing importance of photography, was very desirous to add photography to our other business; circumstances then brought me into communication with Signor Caldesi, and about April 1857 I established him, with the consent of my partner, on our premises.

"866. Who is Signor Caldesi?—He is my partner; he is a photographer, and his business is established with our business; the two houses work as one: we have one door and one communication, and to all intents and purposes we are the same. In December 1857 Sir Benjamin Hall wrote a letter to Mr. Willshire, who then was the superintendent of the pictures at Hampton Court, authorising him to remove the cartoons for Signor Caldesi to photograph. In February 1858 the Government of Lord Palmerston went out; and in March 1858 Caldesi and myself, having well considered the matter, made our arrangements. Signor Caldesi went to Hampton Court, and presented his letter to Mr. Willshire, who at once said that it was an informal letter.

"867. Did he say why it was informal?—Because the letter written to Mr. Willshire was a kind of private letter, which he did not feel quite comfortable in acting upon.

"868. Did he say that it was not in Sir Benjamin Hall's jurisdiction to give this permission?—Not in the least degree. That was in March 1858. We then made an application to the Board of Works, shortly after March 1858.

"869. To Lord John Manners?—Yes; I rather think that we made it through his private secretary; and the reply was, that they knew nothing about the matter; that the Department of Science and Art were going to photograph the cartoons. Of course we were going to be put down in that way, having received from Sir Benjamin Hall permission; and we forwarded to the Board of Works, or Lord John Manners, Sir Benjamin Hall's permission. A long interval occurred, during which the Department of Science and Art made the most determined efforts to shut us out; and a most voluminous correspondence took place, which now exists at the Board of Works. On the 23rd of March, 1858, we sent to the Board of Works Sir Benjamin Hall's letter to Caldesi, in which he desired Mr. Willshire to take down the cartoons for him to photograph. That letter was acknowledged by the department on the 24th of March, and on the 12th of July, 1858, we received a letter, which I will read: 'Sir,—With reference to your letter of the 23rd of March last, and to this Board's reply of the following day, I am directed by the First Commissioner of Her Majesty's Works, &c., to acquaint you that arrangements have been at length completed for affording the greatest possible facility and security in taking photographs of the cartoons of Raffaelle in Hampton Court Palace. These arrangements have been made by the Science and Art Department, and approved of by this Board, and permission has been given to the officers of that department to take photographs of the cartoons for the use of the Scools of Art, on the understanding that you are to be admitted to photograph at the same time, and to share in every respect in the facilities which are afforded to them. The necessary directions have been given to Mr. Willshire, the superintendent at Hampton Court Palace; and Mr. Staire, the Board's assistant surveyor for the country district, has been instructed to afford you such information as you may require. I am, sir, your obedient servant, *George Russell*, Assistant-Secretary.—Office of Works, &c., s.w., 12 July, 1858.' Then a communication took place between ourselves and Mr. Thurston Thompson, who was disappointed to find that he had a rival in the field. Mr. Thurston Thompson made use of the following expression to me: 'I must now seek another publisher for my cartoons.' I mention that, because I hereafter will show, that though Mr. Thurston Thompson acted as the photographer for the Department, and was sent to Paris with the public money, he dealt in his productions executed with the public money. In this bill (*producing the same*) I find '33 Raffaelle photographs 8*l.* 5*s.*;' those being the Raffaelle photographs executed with the public money in Paris. At the end there is '25 per cent. discount,' and those photographs are now sold by the Department at 1*l.* 9*s.* 9½*d.* unmounted, instead of 8*l.* 5*s.* That bill is made out 'Messrs. Colnaghi and Co. to Thurston Thompson, 13th December, 1857,' and receipted by 'Thurston Thompson, 5th January, 1858.' I produce that to show, that, by some private arrangement with the Department of Science and Art, this photographer had a right to trade in the public property. My object is to show the operation of the Department of Science and Art upon our business, and thus upon the interests of photography in general; and in doing that I may be permitted to refer to a matter which occurred some time before, showing the extreme jealousy with which the interests of Mr. Thurston Thompson were guarded by the department, and how they endeavoured to shut out every other photographer from everything touching that department. I beg to inform the Committee, that in 1857, during the establishment of the Manchester Exhibition, we produced the most extraordinary work in photography which, up to that time, had been brought out, giving photographs of 200 of the most important works of drawings and paintings in the Manchester Exhibition. Our design originally included copies of some of the works of art belonging to the Department of Science and Art, and I wrote to Mr. Henry Cole, requesting his permission to photograph such objects while they were at Manchester. To that request I received this reply: '16th of April, 1857. Dear Sir,—I think you will have no difficulties in getting our photographer to make any photographs for you, when the objects are returned to London. Herewith you have an official answer. Faithfully yours, *Henry Cole.*' The consequence of that answer of Mr. Cole was, that we at once abandoned that part of our scheme which related to the public property at Brompton.

"870. What was the official answer?—Something to this effect: 'Sir,—I beg to acknowledge the receipt of your letter, and to inform you that the department has their own photographer, who will execute what you want; but, of course, a copy of it will be found at the department.' As to the cartoons, the permission, as I stated, was granted on the 12th July, 1858, and, some time in July we commenced to photograph them. An arrangement had been made by which we were to begin first, because we had quite established that our permission was prior to that of the Deparment of Science and Art. But Signor Caldesi, for some reasons, waived his right, and Mr. Thurston Thompson began on the understanding that, when Mr. Thurston Thompson had completed his operation on the first cartoon, it should be delivered up to us. I, unfortunately, was ill, and unable to go often to Hampton Court myself. Signor Montecchi, who was at that time Signor Caldesi's partner, was ill too, and Signor Caldesi having the entire work of the house in Pall Mall to attend to, engaged Mr Prout to help him. Signor Caldesi taught his practical method of working to Mr. Prout, who commenced, with Signor Caldesi and two assistants, at Hampton Court about the end of July. So many obstructions were put in our way, that we found extreme difficulty in prosecuting our task.

"871. Obstructions were put in your way; by whom?—By the photographer of the department.

"872. In what way?—By keeping the cartoons much longer than necessary. We made a charge in a letter, which I have here, to the Board of Works, that the arrangement entered into with us with the photographer of the department was not carried out; that the photographer of the department was so tedious in his operations, that we should not be able to complete our work by the time required, and we therefore begged the interference of the Board of Works. That letter procured the following reply: '8th of October, 1858. Gentlemen,—I am directed by the First Commissioner of Her Majesty's Works, &c., to acknowledge the receipt of your letter, dated the 6th instant, stating that Mr. Thompson has prevented you from proceeding with your photographs of the cartoons at Hampton Court Palace, and I am, in reply, to acquaint you that it appears, from a communication received by this Board from the Department of Science and Art, in consequence of your representation, that Mr. Redgrave, of that department, has already given directions in the matter, and that the First Commissioner trusts, therefore, that no further difficulties will be thrown in your way. I am, gentlemen, your most obedient servant, *Alfred Austin*, Secretary.' I trouble the Committee with these facts, because I am led to believe that Mr. Cole, the other day, said that we had worked in a most harmonious way. I have had but a few words reported to me of his evidence; but I wish the Committee to understand, that, from the first, we were met by the most determined opposition, and that from a rival mercantile establishment the opposition could not have been more serious. The letter of the First Commissioner of Works, which I have produced, shows that our complaints were not unfounded. In order to give some idea of the expense, I have made a calculation to show that the price at which the department sells is quite illusory. I believe, if Mr. Thurston Thompson himself was called before you he would not deny it; and if Mr. Thurston Thompson, by any obliquity of vision, did deny it, there is not one practical photographer in Britain who would not say that the prices charged at Brompton are much beneath the cost of production. With the permission of the Committee, I will give an estimate of the cost of producing these cartoons. Two sheets of paper 30 by 24, on which our photographs are printed, cost 8*s.* When the impressions are printed there are several little white spots, and other accidents that require re-touching; the re-touching costs 2*s.*; we then carefully mount them, in order to put them before the public in a proper way; 4*s.* is required for a sheet of paper for that purpose; besides which, we pay 1*s.* for pressing. Then, in order that the public may know where they are published, and the title, we give 1*s.* 6*d.* for engraving such title; thus 16*s.* 6*d.* is the cost to us. Now, our cartoons were sold at 14 guineas the set of seven, and 33 to 50 per cent. discount was allowed to wholesale houses. They must be supplied at prices which will allow them to profitably retail. Therefore, these cartoons which cost us 16*s.* 6*d.*, we sold to the trade at from 1*l.* 1*s.* to 1*l.* 8*s.* I take the trade calculation, because, for the purposes of business, the trade price is always taken; the general trade being the customer to whom a producer looks for his profit. What is sold privately is exceptional; therefore, there is left for our profit 11*s.* 6*d.*, and 4*s.* 6*d.* the difference between the 16*s.* 6*d.*, the 21*s.*, and the 1*l.* 8*s.* Out of that, we have to pay for the two glasses on which each cartoon is executed, two guineas extra rent at Hampton Court, travelling expenses backwards and forwards, Mr. Prout's salary, five guineas a week, another gentleman, three guineas, and another 1*l.* 10*s.* I should say that, in consequence of the delays to which we were exposed, what we might conveniently and comfortably have done in one month, we were engaged four months upon; we also had to pay to the Board of Works the half of 60*l.*, which was the estimated charge for the scaffolding reared for the execution of the photographs. I think that the Committee will see that we produced our cartoons at a price as low as they could be possibly published at, having regard to making a profit out of them, and giving the usual discount to the trade. I did not wish the charge to be raised that they were published at a high price, and therefore we published them at the very lowest price we could, and I am encouraged in that belief by referring to the catalogue of the photographic exhibition which was held in January of last year; there I find that the photographer of the department, though he produced those things for the Department of Science and Art, and I suppose was paid by the public money, sold them in his own name, at very nearly our prices; for instance, the small photographs which we sold at 7*s*. 6*d*., he sold, as I understand, at 7*s*. 6*d*. to 12*s*. His cartoons were a trifle larger than ours, two inches one way; he sold his at two guineas; therefore, I am bound to believe that he, making a careful estimate like ourselves, found that to yield a profit, they could not be sold for a less price than we put upon them. I find that at the Photographic Exhibition, there were 30 studies at 9*s*. each, and two cartoons at two guineas, sold. That was in January 1859. Up to that time, not one word had been heard about the great boon which the public were about to receive, in having Raffaelle sold at 3*d*. a foot, or whatever it is. The cartoons appear to have been done by the department with the public money, but Mr. Thurston Thompson had the right, also, of selling them in the open market.

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* Continued from p. 233.

(*To be continued.*)

Proceedings of Societies.

Chorlton Photographic Association.

The first monthly meeting, after the usual summer recess, was held on the 12th of September, Mr. Griffiths presiding.

After the usual routine business had been transacted,

The **Chairman** addressed the meeting on *the Present Position of Photography, viewed as an Art and Science Educator;* and also *On the the Present Unsatisfactory State of our Knowledge with reference to the Chemical Nature of the various Changes involved in the Production of the Photographic Image, together with a short Account of the Working of some of the Negative Processes.* After some observations on the many and important applications of photography, and their influence on the education of the community, he called attention to the defective state of our knowledge on many of the most important points which lay at the very foundation of photographic chemistry. Of collodion itself we are deficient in knowledge of its exact composition at the outset, and of the continual changes it underwent by keeping. Notwithstanding all the attention that had been given to the subject our knowledge of pyroxyline and its preparation was still very imperfect. Professor Hardwich had experimented largely, and had given a formula widely differing from that of Professor Hadow, given to the world some years ago, but he could not say that better, or even as good, results were obtained by the new formula as by the old. Various theories had from time to time been put forth in which an attempt had been made to explain the precise nature of the action of light upon salts of silver; but further corroborative proofs were wanting before they could decide with certainty which of them, if any, was the correct one. The future advancement of photography to the position of an exact science depended mainly upon this point being satisfactorily cleared up. That done, they would not be frightened out of their propriety, as they occasionally were, by the announcement of some such extraordinary (because unexplained) facts or phenomena as the *reversed* action of light on an over-exposed plate; the gradual fading out of the invisible image on the dry plate when kept too long before development, as also its obliteration when exposed to the vapours of iodine, acetic or nitric acid; the development in daylight of a collodio-albumen plate, after the removal of the iodide of silver; the non-sensitiveness of dry collodion, when a slight trace of any soluble chloride, iodide, or bromide was present, and the return of sensitiveness by simply washing it away. In regard to the various processes in use for landscape photography, he had had a limited personal experience of the wet collodion, the oxymel, the gelatine, the gum, the collodio-albumen, the milk, and the simple dry collodion processes, and had succeeded in obtaining fair, though varying results from all, and he believed all would be found equally good in the hands of equally good manipulators. If the convenience had been equal there was no doubt but that the wet collodion process was most certain and satisfactory; and after it, far outstripping in his estimation all other dry processes, was the improved patent process of Dr. Hill Norris. From results he had recently seen he had no hesitation in saying that it was, as described, fully equal in sensitiveness to wet collodion, without any of its attendant disadvantages.

Mr. **Hooper** exhibited several negatives and transparent positives, as specimens of the new waxed albumenized paper process, on which he had recently been experimenting. He said they were prepared by coating the paper with plain albumen, coagulating it by immersion, or floating it on alcohol after drying, which was rapidly accomplished. He coated with iodized albumen, prepared by mixing as a formula—

Iodide of Potassium	25 grains,
Bromide of Potassium	3 grains,
Albumen	1 ounce,

well frothed, again coagulated and dried, sensitized on the nitrate of silver bath, washed in plenty of water, and hung up to dry. The formula was not perfect yet, although the specimens were on the whole better than he expected; but he wished to make the Society acquainted with the results of his experiments. He had found it very successful in copying in the printing frame, but it was hardly as good in the camera as he wished; however, in his opinion it was sharper than waxed-paper. For printing positives it answered very well; and, from being so sensitive, they could be printed by gas-light in the evening, which he was sure would be an advantage to amateurs, enabling them to produce prints on paper after dark.

Mr. **Wardley** remarked that, if this process could be made to work for positives, it would be very useful to enable persons to print in dull weather or in the evenings, and by all means urged upon Mr. Hooper to go on and perfect it; but for his part, he hardly expected to find it better than *good* waxed-paper for negatives.

After some further conversation regarding Dr. Hill Norris's plates, Messrs. Petschler and Mann's, &c., the proceedings terminated.

[The specimens produced by Mr. Hooper by his new albumenized waxed-paper process, some of which have come under our own notice, are exquisitely full of gradation and detail. We trust Mr. Hooper may be able to perfect the process for use in the camera, as a great boon to the art. We commend it to the attention of our readers.—Ed.]

Miscellaneous.

Photographing Extraordinary.—Under this head *Humphrey's Journal* describes a somewhat stupendous task undertaken by Mr. Ceileur, a photographer in New York, formerly a daguerreotypist in London. Copies were required of a very elaborate pen-and-ink picture, representing "The Past and Present of the United States." Two years had been expended in producing the picture, and the cost and time required for reproducing it by engraving were considered too much. Photography was therefore resorted to with complete success. It is 38 in. by 30 in., and perfect to the edges; the blacks intense, the lights pure, and the detail so minute that lettering requiring the use of the microscope to read is perfectly distinct. One of Harrison's orthoscopic lenses, two inches and a half diameter, with quarter inch stop was used. Some of the details given by our American contemporary of the manipulation are amusing enough. For instance, Mr. Ceileur is stated to use over a pound of silver a day! Two pounds of collodion were required to cover each plate, the weight of every one of which is stated to be thirty-five pounds. Thirty-six perfect negatives were produced before he began to print; having contracted to deliver 4,000 prints in little more than a month. For printing he uses a 120 grain silver bath. The prints are to sell at about two guineas each.

Photography Three Hundred Years Ago.—According to a M. Sobard, who writes in 1857, there has been recently discovered in Russia a translation from the German 300 years old, which gives a very clear explanation of the principles of photography. The ancient alchemists understood well one of the properties of what we call chloride of silver; they knew that if images were produced by a lens on a coating of this chemical substance, the light parts became fixed in black, and the half tints in gray, while those parts which were not struck by the light were left white. Fabricius verified this curious application of chloride of silver in 1566, in his *De Rebus Metallicis.* Later still, in 1760, just a century ago, Tiphaigne de la Roche, in the singular book to which he gave for a title his own name anagrammatized into *Giphantie á Babylone*, supposed himself transported to the palace of the genii of the elements, the chief of whom thus addressed him:—"You know that tho rays of light, reflecting various bodies, paint them on the retina of the eye, on the surface of the water, and on mirrors. The spirits or genii of the elements have sought to fix these passing images; they have composed a very subtle adhesive material, which hardens very quickly, by means of which a picture is made in the twinkling of an eye. They spread this substance on a piece of cloth, and expose it to the objects they wish to depict. The first effect of this prepared cloth is that of a mirror, near and distant objects being shown upon it, but that which a glass cannot effect, this cloth with its viscous covering does, namely, it retains the image faithfully; a process which is the work of the first instant this is received on the cloth. It is taken away directly to a dark place, and an hour afterwards the glazing is dry, and you have a picture far more precious, truthful, and lasting than any that art can produce." The spirit then entered into a physical disquisition; first, on the nature of the glutinous body which intercepts and keeps the rays; second, on the difficulties of preparing and employing it; thirdly, on the mutual action of the light and the glutinous body. "Three problems," adds Tiphaigne, on waking from his trance, "which I propose to the philosophers of our days, and which I leave to their sagacity." Thus, if for the "viscous cloth" of the dreams of Tiphaigne we substitute iodized plates, paper, or collodion, we have the realities of Daguerre, Niepce, and Fox Talbot;—nay more, for the genii fixed the colours, as well as the forms, of the objects pictured. What will our Claudets, Fentons, Mayalls, and Herbert Watkinses say to this!—*The Register.*

New Field for Photography.—As nobody having any kind of name can now-a-days escape the shop window and the photographer; as all our acquaintances of note smile on us or grin horribly a ghastly grin as the case and face may be, from every pictured pane and every newsmonger's stall; it is manifest that human celebrities must be rapidly tending towards artistic termination. There is but one Prime Minister; there are but two prime pugilists, sixteen or seventeen very popular preachers, fifty popular Members of Parliament, twenty popular men of science, five great antiquaries, and a dozen or so of bishops—barring the colonials—and three or four poets. One a week out of their number rapidly exhausts the list; and we cannot largely add to it, for the benefit of the artists and engravers. It is in vain to publish the likenesses of men whom nobody knows. They may be angels, but they are strangers; and the popularity-loving public will not buy their portraitures. Besides, such modest men could not throw the air of conscious greatness into their aspects and positions. When a gentleman knows that a thousand or two of admirers are gazing at him twice or thrice a week, he commonly carries about with him the air of one who feels that he is the "observed of all observers;" and he, at a moment's warning, puts himself into the attitude of a youthful phenomenon, a spectacled spectacle, a middle-aged marvel, or a venerable sexagenarian. On the contrary, men who are never looked at can never look as if they were; and downcast, dejected geniuses who do not look up boldly towards the sun, have no right to expect that the sun will look down favourably upon them. Hence they make indifferent photographs and intractable engravings. How can a man who always keeps himself in the shade expect to be exhibited in the light? No, such subjects will not suit the illustrated papers. Indeed, unless a few Garibaldis start up from the crowd, artists and publishers have but one unfailing resource; and that is, *photographs and portraitures of animals,*—a series of striking likenesses of all the principal beasts, birds and fishes, from life, with a brief biography attached to each, including sundry little incidents of behaviour in earth, air or water, either at home or abroad, either in the wild free life of the plains, the deserts and the seas, or the calmer and more limited course of existence between a cage or cupboard or tank in the Zoological Gardens and a grave under its suburban shadows. Perhaps, if we come to details, there might be some difficulty in making the animals stand or sit as we ourselves are tortured to do in the photographer's chair. "Have the kindness to put on a pleasing look, if you can, sir," politely asks the master of the camera,—a request which would probably pass unheeded by lion, hippopotamus, rhinoceros, bear and bison.

Intense Collodion.—Dr. Milton Sanders recommends as a means of obtaining density in negatives, the introduction into the collodion of organic matter in the shape of sugar. To effect this he dissolves one grain of white sugar in a few drops of water, and this solution is to be added to the alcohol in making the collodion; one grain of sugar being sufficient for four ounces of collodion; and causing it to yield negatives of the utmost intensity. The introduction of too much sugar renders the film rotten, and in some cases it will be found desirable to reduce the amount here given.

Is the Sun growing Cold and Dark?—There are now more spots on the sun than have been seen before for many years; some of these are visible through a smoked glass to the naked eye. Several stars—some of them of great brilliancy, which, from their ascertained distance, must have been as large as our sun—have totally diappeared from the sky; and the question has been raised among astronomers, whether the light and heat of the sun are gradually fading away. As this would be accompanied by the destruction of all the plants and animals on the earth, it is rather an interesting question. The sun's light and heat is diminished by the dark spots at the present time about 1 per cent.

Photographic Notes and Queries.

Converting an old Positive into a Negative.

Sir,—I have a good glass positive of a deceased friend, of which many others of my friends are anxious for copies. Can you tell me if there is any certain and safe method of converting it into a negative without risk, so as to produce paper prints from it. Or will it be better to take glass positive copies of it? J. M. Lake.

P.S.—It is varnished with crystal varnish.

[Your safest course would be to take copies in the camera, either glass positives or a negative. If you wish to convert the original into a negative, it may be done without much risk if the manipulation be skillfully managed. There are various processes for effecting such a conversion; but the one most successful in our hands is as follows: First remove the varnish thoroughly by repeated washings with benzole, which will effectually dissolve the crystal varnish. When the film is quite clean, first moisten it with distilled water, and then cover it with an aqueous solution of iodine, strength not material, say about the colour of port wine. When this has remained on some five or ten minutes, wash, and then apply a two-grain pyrogallic acid developer, with a few drops of a twenty-grain silver solution. Intensify with this, and if more density be required, wash and use the solution of iodine again, and repeat the pyro and silver solution alternately, until the desired intensity is obtained. The chief danger is an occasional tendency for the film to leave the glass. Care must be taken in washing if this tendency be observed.—Ed.]

Alcohol in Developing Solution.

Sir,—I have been for some time using a developing solution for producing collodion positives on glass, which stands as follows: fifteen grains of photosulphate of iron, twenty minims of glacial acetic acid, and twenty-four minims of alcohol to an ounce of water. Until recently I have never had any difficulty in getting clean pictures; but a week or two ago, I made a new bath, in using which every picture is stained. The developer runs in greasy lines and streaks in every picture. I added more alcohol, as I have done on former occasions with success in such cases, but that did not mend the matter, but seemed to make it a little worse. I made the bath in the usual way, as I have always done. Can you tell me the cause and remedy?—Yours, J. S. L.

[You have unconsciously explained your difficulty. You added more alcohol, and that made the matter worse. If you had reflected, that should have suggested to you that alcohol might be the original cause of your trouble. It is a common defect in formulæ for developing solutions that they give a definite quantity of alcohol as though it performed any part in the development: whereas its only office is to make the developer flow freely on the plate. To effect this the amount of alcohol in the developer should be exactly proportioned to the age of the nitrate of silver bath, or in other words to the amount of ether and alcohol the bath has absorbed from the plates excited in it. A new bath requires little or no alcohol in the developer; whilst an old one often requires more than the amount usually given in such formulæ. Too much alcohol with a new bath will make the developer flow "greasily," just as too little will do in an old one.—Ed.]

Talk in the Studio.

THE RECENTLY DISCOVERED CORREGGIO.—A painting of considerable interest to art amateurs is now exhibiting at 119 Oxford Street. It is a very finely executed "Ecce Homo," and is stated to be a production of Corregio of a much later date and with more matured power than the painting of the same subject in the National Gallery. It is sufficiently varied and improved in several points of treatment, to preclude the notion of its being a clever copy; and all the characteristics and power of the great master are sufficiently marked to dissipate the idea of its being an original by another hand. When found it is stated to have been almost entirely painted over so as to conceal its real value, a treatment it is supposed to have received when the French made an irruption into Italy at the lattter part of the last century.

PHOTOGRAPHS FROM JAPAN.—A case of rare and curious photographs of the scenery of this interesting country, and illustrative of the manners and customs of the Japanese tribes, which have been executed by a special artist sent out for the purpose by the enterprising firm of Negretti and Zambra, of London, are expected by the Peninsular and Oriental Company's steam ship 'Ceylon'; which will probably arrive at Southampton on Wednesday.—*Times.*

FIFTY POUNDS REWARD are offered by the Shipwrecked Mariners Society for an invention to afford easy and certain communication between a wrecked vessel and the shore. As we know of no class of men who, as a class, are more ingenious than photographers, this is an announcement likely to interest many of our readers.

"DOORSMAN," or Touter, in the shape of a cat, with a specimen picture in his hand, to small swell in the shape of a mouse, passing the door of a cheap portait gallery: "Step in, and be *done,* Sir!"—*Punch.*

NE SUTOR ULTRA CREPIDAM.—A correspondent in Edinburgh calls attention to the fact which he regards as *infra dig.*, that a banker's clerk of that city has added to his usual avocations that of hawker, amongst photographic dealers, of album portraits of living celebrities, which he has produced. It is only the motive which could make such an act undignified. A score of motives might be suggested which would, on the contrary, render it worthy.

HEAD OF JOHN THE BAPTIST.—Some of our readers may have seen an exquisite photograph, recently issued by Mr. O. G. Rejlander, of the "Head of John the Baptist in a Charger." It consists of a noble head, betokening all the calm placidity of death, and the solemn grandeur of a martyr's death. The head is resting on a napkin, and the napkin in a charger; the whole being carefully vignetted. Two of our contemporaries have noticed this is a composition photograph, and many eminent photographers have concurred with them in regarding it as such. In a letter we had the other day from Mr. Rejlander, he confirms our own conviction on the subject; he says, in answer to our question, "it *is* from one negative; but it has been a long time hatching." Such work is worth a little extra time and trouble.

CHEAP PHOTOGRAPHY.—A correspondent informs us that recently visiting a wholesale warehouse where ornamental book marks formed an item of trade, he observed some of them embellished with small photographs. The extra cost of photographs, he was told, including production of negative, printing, toning, &c., together with cutting out and mounting, only amounted to *one penny each.* Here is surely a chance for photographers to make a fortune!

OBITUARY.—We regret to announce the recent decease of a gentleman to whom photography is much indebted, and who was intimately associated with the discovery of the collodion process—Mr. Peter W. Fry. He was one of the original promoters of the establishment of Photographic Societies, and was, until recently, a member of the council. His loss will be deeply felt by a number of scientific and artistic friends.

EXCHANGE CLUB.—Those of our Correspondents who wish their names published in the next list will be so good as to remember that in publishing their names we assume the responsibility of implying that their productions are up to the mark in quality. It is important, therefore, that a specimen print be in all cases forwarded with the name. A few of our Correspondents in sending their names to be entered on the Exchange list, have not complied with this necessary requisition.

To Correspondents.

M. D.—We are not personally familiar with the instruments of the maker named. They may be good, but they do not rank as first class.

J. L. S.—Much depends upon the management of the "Photogen." Of course it is not equal to sun light; but we have seen some very respectable collodion positives produced by its aid. We believe that better pictures might be produced by it than many that have been exhibited. We have not seen any application of the lime light to photographic purposes, but understand that it has been done.

A., Gloucester.—Your photograph has many points of interest, and a good impression of it we should think worthy of exhibition. The subject is well chosen; but the manipulation is a little defective. There is a want of crisp definition in the foliage, which, if not the fault of the lens, is the result of bad focussing. Such a subject would have been more effective if taken in a brighter light.

W. BURTON.—The toning bath you have been using requires great care and skill in chemical manipulations to ensure success. The alkaline gold toning bath will give you the best results. Mr. M. Lyte's is a very good formula. Your negatives with careful printing and toning by this means will give much better results. Print a little more deeply.

N. C. CAMM.—We will insert your name. We should recommend you, however, to use the alkaline gold toning bath in future. The specimen sent is from a good negative, but the print is decidedly fading. You must remember, in preparing albumenized paper, that the paper itself has a rough and smooth side. If you are not careful to examine your paper first, you may easily get a rough surface. Many of the samples of albumenized paper prepared by large manufacturers, are rolled or hot-pressed to give them surface after albumenizing.

R. M.—The process of printing and toning you describe is very good, and ought to produce first-rate results. A little more vigour in the negative, so as to admit of deeper printing, seems necessary. Possibly another sample of paper a little more highly albumenized would give you more brilliancy. The specimen sent is a pleasing artistic picture, and would, if it possessed little more vigour combined with its softness be very fine. Are you sure your silver bath is of the strength you state?

E. F. G.—The process of copying from a glass positive is just the same as that from the life; with the exception that a little care is necessary in placing the picture to be copied in a suitable light. Take the picture from the case or passe-partout, and place it quite upright in a good light, taking care that its surface is free from reflections. Bring the camera very close to it, and draw out the sliding body of the camera until you get an image of the proper size in correct focus. If the copy be required the same size as the original, the sliding body must be drawn out until the focussing glass is as far distant behind the lens as the picture to be copied is in front. If you have not a copying camera, you will probably need to improvise a means of lengthening the body of your camera. The exposure will probably be a little longer than from life.

H. C. H.—You can print from a vigorous paper positive, but your lights and shadows will of course, be reversed; and produce a negative. From this you may print again. You will lose something of detail in each process so that your resulting print will be inferior to the original. Waxing the paper print will improve its transparency and make it print better.

H. C.—"Craping" in the collodion film may proceed from two or three causes, originating with the pyroxyline, the solvents, or the iodide. If the pyroxyline has been made at a very low temperature, it sometimes gives a glutinous film, which it is difficult to prevent craping. The use of iodide of cadmium, by slightly gelatinizing the collodion sometimes produces the same results. But by far the most common cause of craping, especially when it occurs when dry, in a film which appeared perfect when wet, is too much water in the collodion, that is the use of two weak solvents. Try another sample of collodion. Also, allow the film to set well before immersion in the silver bath.

TRIPOD.—The use of a bromide in your collodion is favourable to the successful rendering of foliage. Indeed, without you will hardly succeed perfectly in landscape photography.

L. H. V.—Try the Turpentine Waxed Paper Process. For large pictures it is well suited.

DRY PLATE.—We have heard most favourable accounts of Dr. Hill Norris's extra sensitive dry plates, and hope shortly to try them. The process is not, we believe, the subject of any new patent; but is probably an improvement in the process patented a few years ago by Dr. Hill Norris.

MICRO.—Some especial apparatus is necessary for the practice of micro-photography. We shall probably refer to the subject in our next. See a work on the subject announced in our advertising columns.

G. P. G.—For a positive bath use one ounce of nitrate of silver to fourteen ounces of distilled water. We have never made a calculation of the quantity of bath solution used in coating a "medium" plate. We do not understand to what you refer as "pure soda in crystals." There are many good collodions for positives in the market; but we cannot undertake to recommend any especial maker. See our advertising columns

OXIDE.—Add the solution containing oxide of silver by a drop or two at a time, and try the result. Streaky pictures are generally caused by alkalinity or organic matter in the bath. A minute dose of nitric acid is the remedy for the first, "sunning" the bath is often an effectual remedy for the second.

C. EADES.—We cannot refer you to any especial house for pyrophosphate of soda; probably any wholesale chemist will supply you. The ordinary or tribasic phosphate of soda gives a yellow precipitate with a solution of nitrate of silver. The pyrophosphate, or bibasic phosphate of soda, is distinguished from it by giving a white precipitate with nitrate of silver. Monobasic phosphate of soda also gives a similar white precipitate; but there is no danger of confounding one with the other, as the latter does not crystallize. We cannot tell you of any maker of lamps suitable for the lime light. Residing in Birmingham you surely have the best access to such manufactures.

R. T. SCOTT.—We believe some photographs of the Eclipse have been published for sale.

NOTICES of several pamphlets and stereograms received, in our next.

All Letters, Works for Review, and other Communications for the Editor, should be addressed to the Office, 32 PATERNOSTER ROW, LONDON.

THE PHOTOGRAPHIC NEWS.

Vol. IV., No. 110.—*October* 12, 1860.

PHOTOGRAPHIC ENAMELLING ON GLASS, &c.

A new process in photography, likely to prove of considerable importance in ornamental art, has recently been patented by M. F. Joubert, who is already known to the scientific and photographic world as the inventor of a process for giving a face of steel to an engraved plate of copper, and of a method of printing in permanent ink, which he has styled phototypy.

This process is for the reproduction of photographs on glass and ceramic wares, and burning them into the surface. It appears to be based on principles already known, the novelty consisting in the combination and application of them. Numerous attempts have before been made to burn in photographs on ceramic surfaces; but, if we remember rightly, in all these cases the aim has been to fuse a film or surface of glass or enamel, on to another similar surface containing a photograph, which has thus been preserved between the two vitreous surfaces. In the process of M. Joubert the photograph itself forms the enamel.

The specimens we have seen embrace every variety of subject, both photographic portraits and landscapes; reproductions of engravings, drawings, designs, &c., and in all cases the result is perfect, as well in the production of gradation by half-tone as by lines and points. The specimens submitted to our attention are in various tints of monochrome, but the process is, we understand, capable of producing a variety of colours in one picture.

The process is based on the known action of light on the salts of chromium in combination with organic matter, but it is materially different from most other processes based on this action of the same salts. A solution of bichromate of ammonia of the strength of one ounce to four of distilled water is prepared by heat. Of this five parts are added to a mixture of honey, albumen and distilled water, prepared as follows:—Three parts of good honey (or in some cases treacle) are melted at a temperature not exceeding 100° Fahrenheit, and mixed with an equal measure of well-beaten white of eggs, which has stood about eight days. After these have been intimately mixed, thirty parts of distilled water are added, and then the before-mentioned five parts of bichromate solution. After filtration, the mixture is ready for use, and should be kept in the dark.

This preparation forms a solution of about the consistency of collodion, and is poured on a well-cleaned glass plate in a similar manner. This coating must then be dried by means of gentle heat in a dark room; it is then ready for exposure.

The negative, or what supplies its place, must consist of a transparent positive on glass or paper. In several specimens which we saw, an ordinary albumenized print had been well waxed and served the purpose admirably; drawings, engravings, &c., treated in the same way will answer the same end. The negative being placed in the pressure frame in the usual way, the prepared glass is laid upon it and screwed down as in paper printing. The exposure varies with the light, about a minute in a bright sunshine being sufficient. On returning to the dark room a slight image is visible to the practised eye. The action of the light has been through all the transparent parts of the superposed transparent positive, on what are to constitute the lights of the enamel picture. The effect of the light has been to harden such parts, whilst the parts in shadow retain a sticky surface, just in such degree and proportion as they have been protected from the action of the light.

The plate now possesses a partially adhesive or sticky surface, the picture being formed by the various gradations of adhesiveness. The next step is analogous in some respects to the development of a latent image, not by chemical deposit, but by the mechanical application of a vitreous colour. A very finely ground enamel colour of any tint, is applied by means of a large camel's hair brush. This adheres to the surface of the picture in proper gradation, at once producing a pictured copy of the original. In the mechanical application of colour, many of the characteristics of the picture are under the control of the manipulator, and afford opportunity for the exercise of considerable artistic taste. Vigour can be given to some parts by more copious application of the colour, and tenderness and delicacy to others by sparing it; whilst vignetting, &c. &c. can easily be effected.

When this part of the process is completed, alcohol, to which a little nitric or acetic acid has been added, is poured on to the surface carefully, and after flooding the whole poured back again; this process is again repeated with alcohol without acid until the film is well soaked. It is then slowly dried. When quite dry the plate is immersed in clean water containing a little carbonate of soda: by this washing the yellow tint of the chromic salt is removed, and the picture appears bright and clear as a transparent positive by transmitted light. When dry it is ready for burning and is placed in the muffle; the enamel colour applied, then being fused and combined with the glass.

The process of burning enamels is unnecessary to be described here, as it is presumed that no one would attempt it without full facilities and a knowledge of the requirements of the operation.

The above brief details comprise the whole of the processes so far as they relate to monochromes. Where several colours are required in one design or picture, they can be produced by repeating the process with several negatives, each having the parts intended for different colours stopped out. The combinations of colours which may thus be produced need only be limited by the nature of the materials; the precaution, of course, being observed, to use those colours which require the highest degree of heat before they melt, first, each successive colour fusing at a lower temperature, so that they may be fired without danger to the first applied enamels.

If we may judge by the specimens we have seen in the atelier of M. Joubert, the process has been brought to a high state of perfection, and in its present form presents few difficulties. The transparencies on glass are many of them of a large size, and possess beauties of a very high order. For stereoscopic transparencies this method of production will possess many advantages, as the pictures present an indelible surface requiring no protection. Slides by this process may be printed to yield a good profit, we understand at half the prices now charged for similar slides produced in the usual way. As slides for magic lanterns they possess many advantages unattainable by existing methods of production. It is unnecessary, however, to enter into further detail as to the purpose to which the process is applicable; suffice it to say, that for any purpose in which permanent designs on glass or ceramic surfaces are required, this method of producing them is likely to take precedence of all others, both as regards beauty and facility of application.

DIRECT POSITIVES ON COLLODION.

NEW PROCESS, BY M. SABATIER.

The author of this process is a distinguished entomologist and amateur photographer. Convinced that direct positives of the insects described in his volume would impart much interest and value to his work, he made every effort to obtain them. At first he had great hopes of the method proposed by M. Poitevin,* but the exposure required was too long to operate upon living insects. He then endeavoured to contrive a method for himself, and succeeded in arriving at one which gives very excellent results. His positives of living insects are very sharp and vigorous.

The essential difference of this process consists in the pictures being the result of a superposition or entangling of two images, one negative, the other positive.

Doubtless, M. Sabatier has, without knowing it, hit upon the same idea as Count Schouwaloff communicated to the French Photographic Society at its meeting in October, 1859. But this was only a suggestive attempt, the noble Count appealed to more practised photographers to suggest means of overcoming difficulties which were to him insurmountable. M. Sabatier, ignorant of the count's experiments, has succeeded in producing a perfectly rational and complete process.

The most elementary drawing is necessarily composed of two colours; that of the crayon and that of the paper upon which the design is made. From the association and the agency of these two colours the representation of objects results, while with one of them only representation is impossible.

In photography, what we call a negative of a single colour varying in tone or intensity, represents an object only by associating a second colour with it, and viewing it as a transparency, or by putting it on an opaque body, which causes all the details to appear. A positive under the same conditions, would of itself have no value, the negative and the positive of the same object being two halves of the same thing, which can exist only by their union.

The photographic process now suggested and described consists in uniting these two halves, as is done in the Daguerrian plate, not by means of an artifice which more or less produces an illusion, but in actually entangling a positive in a negative; that is to say, in rendering chemically positive all the molecules which have not become negative under exposure to the luminous rays.

This process is based on a capital fact which until the present time has remained unnoticed, namely:—that many substances poured in solution upon a negative *in course of formation*, exercise upon it, whatever be the developing agent otherwise employed, a *disturbing* and *substituting* action, so that the development of the negative is stopped at the moment of contact, and the chemical combination that follows this contact gives rise to a positive.

The substances which exercise this perturbating and substituting power are probably numerous. Perhaps they comprehend many neutral salts and all the alkalies, but from the necessity of limiting our researches it will be found that lime-water, solution of ammonia, and nitrate of silver possess this power in the highest degree.

To establish the truth of a fact of such great importance, and put it beyond the reach of doubt or dispute, the following is the method pursued:—

Upon a sheet of white paper draw in strong black ink a series of large radii, then place it on a screen and focus it in the camera, on a collodioned plate iodized and sensitized in the usual manner. Upon returning to the dark room after exposure in the camera, pour on the collodioned plate an acidulated solution of pyrogallic acid, and when the whites of the paper begin to appear, and long before the action of the developing agent is exhausted, wash the plate in distilled water, and pour on it a weak solution of nitrate of silver.

One or two minutes after this last operation the whites of the image will appear unchanged, but the blacks will appear so much more intense in proportion to the diminished length of time the pyrogallic acid remained on the plate. The same result is arrived at if, instead of nitrate of silver, we pour on the plate a solution of ammonia, or a very weak solution of lime-water.

This experiment infallibly succeeds, provided the sensitizing solution and the weak solution of nitrate of silver are perfectly neutral; it succeeds also when gallic acid or protosulphate of iron (containing no free sulphuric acid) is used as the developing agent, which places beyond the reach of doubt the perturbating and substituting influence of the three tried substances, whatever be the developing agent employed.

It is easier to prove this fact than to explain it; but for the guidance of those cultivating the art of photography who may be tempted to offer an explanation, the following facts must be noted, the first two of which are, so to speak, only corollaries of the capital fact established:—

1st. On the irregularly blackened plate of a microscope place a glass containing a fly, and on the mirror beneath the plate place a piece of white paper, then take a latent photographic image of the fly. Next proceed in the dark room according to the method described above, a positive is developed, not only of the fly, but of the blackened plate also. But if instead of the white paper which forms the background of the little picture, a black paper is substituted, although the time of exposure be prolonged, and the light more vivid, neither a positive of the fly nor of the plate is obtained upon developing.

It must not be supposed that the light was intercepted upon substituting a black for a white background, for the plate and the fly were both very distinctly seen on the focussing glass; although, on attempting to develop a positive in the dark room the collodioned plate remained white in spite of every effort, while it became black when it was not submitted to the luminous exposure. If the positive be not formed it is only in consequence of the negative itself not being formed.

2nd. As soon as the negative is entirely developed a positive is no longer possible. Nitrate of silver, solution of ammonia, and lime water are without any influence upon the negative arrived at the perfect state.

3rd. The positive is not at first developed in the whole thickness of the collodion film; it commences at the surface next the glass, for it can be seen on that side long before it is visible on the other, and the hypo-sulphite, by dissolving the unimpressed iodide, renders the image visible on both sides.

It results, from the preceding, that nitrate of silver can, with each of the developing agents, determine two successive combinations of different colours—the one bearing upon the whites of the image, and producing a negative; the other bearing upon the blacks, and producing a positive. That these two combinations depend upon each other to this point, that the second commences very exactly at the moment when the first is stopped; that the second acts upon all the space left intact by the first, and lastly, the second becomes impossible from the moment the first is completed. The more the whites are developed, the less blacks there will be, and *vice versa*. The difficulty and importance is to appreciate in what proportions the two colours must be employed, to seize the exact moment when the formation of the negative must be stopped, so that the light and shade may be blended in the most harmonious manner; certain details will be rendered only by making one colour predominate at the expense of the other. Thus the new method demands not only the skill and dexterity of an experienced operator, it requires also the knowledge and taste of a true artist. Every object represented will require special study.

This new process in no respect modifies the operations which precede the employment of the developing nitrate of silver, it only necessitates the stopping the negative at a given moment after the wished-for effect is obtained. To this end the developing solution is washed off with distilled water, and the film covered with a thin layer of nitrate of silver, of the strength of twenty grains to the ounce. This must be done very rapidly, for the pyrogallic acid adherent to the negative continues the developing action even under the stream of distilled water.

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* Photographic News, vol. iii. p. 310.

It has been shown that the contact of the nitrate is alone sufficient to decide the formation of the positive. Moreover, if care be not taken to pour upon the plate moistened with the nitrate of silver, a small quantity of pyrogallic acid, for want of materials the positive will come out with difficulty, and will be apparent only in the deepest blacks. When the nitrate remains upon the plate one or two minutes previous to this addition, the positive is produced instantaneously, and the whites of the picture lose their brilliancy; but if the nitrate acts only temporarily, so to speak, and immediately gives place to the acid, the positive developes itself under the eye with the greatest precision.

If solution of ammonia be employed, or very weak lime-water in lieu of the nitrate, care must be taken to wash the plate with distilled water after the contact of these two substances, then it can be covered again with a layer of pyrogallic acid, to which a few drops of nitrate of silver is added. But we must never lose sight of the fact that success is impossible when the baths contain the least trace of nitric or sulphuric acid We must therefore give the preference to fused nitrate of silver, and make the image appear by pyrogallic acid, which even in this case maintains its undoubted superiority.

The direct positives obtained by this process are fixed like the ordinary positives with hyposulphite of soda, and like them they assume the hue in toning we desire to impart to them.

This process is applicable to albumen as well as to collodion; it is also applicable to paper, (for paper is very similar to collodion,) if some experimentalist will impart to it some of the qualities peculiar to the substances poured on the glass plate.—*Cosmos.*

ON THE ACTION OF LIGHT UPON OPTICAL GLASSES.*

BY A. GAUDIN.

Light is propagated not only through the molecular interstices, but also through the atomic interstices; the molecules are, doubtless, groups of atoms symmetrically arranged around each other, so as to form regular geometrical polyhedra, which are in direct relation with the geometric form of the crystals they engender. It is proved that light traverses the molecules themselves, by the intense coloration of certain crystals, and this proof exhibits itself in the highest degree in certain alums, ordinary alum with potassa or ammonia base, is colourless, while chromium alum is so deeply coloured violet as to appear black at first sight. Yet this intense colouration is produced by the substitution in the molecule of alum, of two atoms of chrome for two atoms of aluminum, and these two atoms of chrome are accompanied by ninety-three atoms which, of themselves can receive no colouration from light. Moreover, in all probability, these two atoms occupy the axis of the molecule, very nearly at its centre. Thus light in its passage through bodies is not only diverted in proportion to the extent and disposition of the molecular and atomic interstices, but also, it experiences the influence of each atom, which allows certain rays to pass, and compels others to be reflected.

For colourless glass very nearly as it is in optical glass, the fact of general colouration is not apparent, nevertheless the light penetrates the most intimate portions of this substance, and during its passage the ray becomes deviated and its several elements dispersed; this is refraction, that phenomenon which is the principal basis of optics.

To obtain refraction it is necessary for the surface of the glass to be inclined in the direction of the incident rays. This may easily be conceived, since in the case of a surface normal to the incident ray, the deviation of the ray is symmetrical with the plane of this surface, and there is no reason why the ray should deviate to one side rather than to another. When the surface of the glass is oblique to the incident ray, it establishes a plane of transmission which contains the incident ray, and then the ray in penetrating the glass becomes inflected, but it always remains in the plane of the incident ray.

Refraction therefore results from a certain arrangement of molecules and atoms occurring in the paths of the ray, and since this arrangement is oblique it follows that the point of penetration will be lower than the point of first contact, and as every ray has a very great length in proportion to the molecular and atomic spaces, it follows that the penetration will be at the same time a result of the obliquity of the ray by relation to the normal of the surface, from the spacing of the molecules and atoms of the vitreous body, and the length and breadth of the simple luminous ray. Thus in this case the total ray is always deviated in making with the vertical of the surface, an angle less than the incident ray, and every incident ray is also dispersed more or less according to the extent of its undulation. The ray which has the shortest undulation is deviated the most, that is to say, the extreme violet ray, and the chemical rays deviate still more.

The change in direction of the luminous rays in passing from air into glass takes place in virtue of the nature and linear disposition of the first rank of molecules, and as soon as the direction is changed, the ray continues on its path in a new straight line, if the glass be homogeneous, for there exists no reason why it should deviate to one side rather than to another.

We are now naturally arrived at the point of considering the nature of the texture and polish of the glass.

All the surfaces of optical glass are spherical, on account of the facility with which glasses of this form are obtained, and by which they correct themselves; it is also indicated by calculation that parabolic curves (very nearly) are preferable in most cases.

Whatever it be, polish is always the result of scratches traced upon the surface of the glass by emery powder, which is employed in a finer and finer state as the work progresses The last application of the emery (the finest) when of good quality, renders the glass translucent, but if we examine its surface under the microscope, we are surprised to perceive that the polish consists of regularly spaced hollows or cavities, the traces, doubtless, of the crossing of the scratches made by the emery first applied.

The object of polishing is therefore to cause these scratches to disappear; three means of accomplishing this are resorted to. By employing, 1st, Oxide of iron, a substance at the same time very hard and very fine, deposited upon a moistened cloth, placed in the mould previously employed. This red imparts a beautiful polish to all appearance, but it is in fact an undulating polish suitable only for eye glasses. 2nd, Paper covered with tripoli-powder; and 3rdly, Oxide of tin, or putty-powder are employed to give the concluding polish, and by exercising due care, we arrive at obtaining well-polished spherical surfaces; and calculation also sufficiently guides us in combining the radii of curvature in employing glasses of a given refringent power, but defects always arise from the imperfect homogeneity of glass.

In examining specimens of polished glass I remarked with astonishment that here and there little inequalities existed, which I could only attribute to unvitrified grains of sand. I mentioned it to the glass-maker, who replied, "this is not surprising, we put as much sand as possible into glass, and we carry the vitrification only to such point as when all the sand seems to disappear, at that moment the glass is in all its beauty and perfection." From this, we may imagine what happens when a luminous ray encounters one of these grains of sand in the substance of the glass, it must inevitably take a wrong direction.

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* Continued from p. 268.

By virtue of refraction then, simple rays combined by a simple lens unite at variable distances, the focus being shorter for the violet rays than for the red, and still shorter for the chemical rays which are the most essential in photography. With achromatic lenses the coloured rays all unite at the same distance from the lens, and as we do not perceive the image they form, it is only by degrees that we arrive at the use of the chemical focus; from this I believe there is a gap to be filled up, a problem to resolve, which sooner or later will receive its solution.

FROM A PHOTOGRAPHER'S COMMON-PLACE BOOK.[*]

My next trip was to that quaint old interesting place, Canterbury. Time being a matter of some moment to me, I went by rail, although I preferred the coach which runs daily from Ramsgate.

Entering the city by its relic gate, and looking up at its grim old dusky face, I soon found myself carried away into that dim region of our past history when poet-priests were our only chroniclers, and their memory our only chronicles. I saw the stern warlike tribe of Britons digging their ditch, and forming that huge mound of earth which is now called the Dane John; looked upon the little huts with their rudely thatched roof standing in irregular groups amid the trees: saw the wicker boats upon the river Stour, whose waters gave their town its earliest name[†]—heard the neigh of their trained steeds, and thought of their terribly destructive career when, harnessed to those celebrated chariots with scythe-armed wheels, they thundered over the most difficult and rugged ways into the foemen's scattered ranks. Then came the conquering Roman foe, and the continually baffled and fearfully desperate savages, true to that instinct which has ever since blinded their descendants to the possibility of defeat, fought wildly to the death, and so per force surrendered their little town of huts to the far mightier victors, under whose protection it grew in importance and extent under the latinized name of "Durovernum."[‡] Here next stood the homely palace of Kent's Saxon king to whom came the Romish monk Augustine, to build in all humility his paltry little church close to the monarch's loftier residence, and again to build in priestly pride the huge monastery which soon swallowed up the regal home as the merest morsel of its own superior dignity.[§] Beseiged by the fierce Danes, into whose hands it was treacherously betrayed by one Elfmar, Canterbury suffered the desolating fortunes of war. Nevertheless it figures in the Norman's Doomsday Book with undiminished importance.

Surely this place is just the spot for a photographer desirous of preserving relics of antiquities, closely connected with so early and important a phase in our history. Interesting objects abound in every direction, and their generally picturesque character give them fresh value for the purposes of the camera.

The first photograph to be obtained was of course the old West Gate, which I have been looking so meditatively at for the last few minutes. It was built by Archbishop Sudbury during the reign of the ill-fated Richard the Second, and is the only one of six remaining. Several views of it may be easily obtained, but they all seem equally good. Standing between two massive towers, embattled and portcullised, it makes a capital picture.

My visit being a very short one, and several non-photographic friends being with me, I did not take many other pictures here, so shall content myself with briefly pointing out some few of the more interesting views which may be secured. Doubtless, Canterbury is so well known to you as to render my descriptions something like impertinence; but, at any rate, they shall not be too protracted.

The city was formerly surrounded with a strong wall; a large portion of this is now standing. It seemed to me that one of the best views to be got of it was obtainable from that portion which skirts the outside of the Dane John. Several of the turrets projected at intervals from the wall, thickly overgrown with ivy, weeds, and flowers, are here visible, and would help to form a very striking picture.

This Dane John, as it is there called, is a large field, delightfully planted and laid out as a public promenade. A smooth terrace runs along within on the ramparts of the old city wall, forming a most pleasant walk, giving some fine prospects of the surrounding country, and having seats fitted up under the strong, old, time-defaced watch-towers for occasional resting places. The etymology of the place is puzzling; whether the Normans, or the Danes, or neither, christened it, has not, I believe, been decided.

Within this inclosure stands the tumulus, or lofty earth mound, I have already adverted to as of probably British origin. It rises in the midst of the flourishing trees, and carefully kept lawn, to a height of more than fifty feet. Narrow serpentine walks wind round its sides to the summit, upon which has been erected a monument to record the noble generosity of an editor of the *Kentish Gazette*, James Simmons, Esq., to whom the public owe the sole use of "this field and hill, and these terraces, walks, and plantations." A long, shady walk between luxuriantly beautiful lime trees affords the inhabitants a charmingly cool and pleasant resort during the heat of summer. The photographer may here secure some excellent studies of trees, but the place is rather too prim and neat to be very picturesque as a whole.

Some remains of the ancient castle, supposed to be Roman, are in existence at the end of Castle Street standing beside some gasworks.

In ecclesiastical antiquity no city can be richer than Canterbury; they meet us at every turn, ancient churches, owing their unaltered condition as much to neglect as to any steps taken for their preservation, seem to be here, and there, and everywhere. The most interesting, ancient, and picturesque of these is decidedly the old Church of St. Martin, already named in a former paper.

It stands on the gracefully sloping declivity of a hill about half a mile from the cathedral, and, apart from its great antiquarian interest, you will be puzzled to find a country church which will better repay the trouble of photographing. The "venerable Bede" describes it as having been originally built by the Romans. King Ethelbert's christian wife, Bertha—to whose influence the success of St. Augustine may be attributed—had an oratory within it; and within its walls also St. Augustine and his companion monks first preached to the converted people of that "barbarous, fierce, and unbelieving nation, to whose very language they were—'not long before'—strangers." The present church is, however, a structure of the thirteenth century, but there is evidence in its materials to show that the more ancient building must have contributed to its re-erection. The body of the good Queen Bertha, as tradition and chroniclers tell us, was buried in this her own loved church, and a simple unpretending coffin of stone in a recess on one side of the chancel has always been pointed out as her tomb. This primitive church, in its simple rustic beauty, stands with its pointed roof, *sans* decoration, and its plain, square, ivy-clad tower amid fine old yew trees, but some of these which once intercepted the prospect having been cut away, a good view of the porch and building is obtainable from the plain. The litch-gate, although a modern erection, is in close imitation of that which stood in the olden time, and will form a very interesting feature in your picture. It is built of oak.

A. H. W.

(To be continued.)

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[*] Continued from p. 267.

[†] "Itinerary of Antoninus," a work about 1600 years old.

[‡] Durwhern, signifying "swift river."

[§] History tells us that the monastery of St. Augustine possessed great splendour of appearance, and the walls of King Ethelbert's palace are still supposed to exist in its remains.

SCIENTIFIC GOSSIP.

A novel application of the stereoscope was announced a year or two ago by Professor Dove. It consisted in the detection of reprinted matter in the case of books, pamphlets, &c., and was based upon the impossibility, or at least extreme difficulty, of compositors, when setting up a page of type with the intention of producing a fac-simile of a page of printed copy, making the blank spaces between the separate words in a line, exactly the same width in the copy as in the original. Our readers may not all be aware that the blank spaces between the words which they are now looking at are made by placing very thin strips of lead or type metal, technically called "spaces," side by side between each group of types forming a word, and so arranging them as to obtain each line of the proper length. These lead "spaces" are so thin that in ordinary work it is never attempted to get exactly the same number between each word, but they are put in in more or less numbers, according to the way in which the words fall at the end of a line—if the line as it is set up in type falls a trifle short of the proper length, it is "spaced out;" and if it exceeds that length by a letter or two, some of the "spaces" are removed, or thinner ones used. In this manner it will be perceived that however accurately the compositor follows the *words* of his printed copy, and sets up his page in imitation of the original, he is sure to be sometimes incorrect with the spacings between the words. A knowledge of these facts led Professor Dove to imagine that if a stereoscopic slide were so mounted as to have the original printed page on one side and the recomposed fac-simile on the other half, an inspection in the intrument would at once detect the reprint. And so it was seen to be on trial. The page of print which the eye apparently saw formed by the superposition of the two stereoscopic copulæ presented the remarkable appearance of not being on the same flat surface, nearly every alternate word started up or retreated to a different plane from its neighbour, and the whole effect was most strange and disjointed, as if the observer were looking at three or four superposed sheets of glass, with the words forming the page dotted at random on different sides of the glass plates. We have thought it right to enter into this at some length, inasmuch as although it was mentioned in some scientific works when first discovered, it was never brought very prominently before the readers of the Photographic News, and also because a knowledge of the foregoing facts is necessary to a proper understanding of what the learned professor has recently discovered. It has been found that wires of different metals, drawn through the same plate, are not all of the same thickness, for they are of different degrees of elasticity, and after being drawn through the plate they expand to different amounts. This expansion is proved by the fact that with the exception of gold no wire can be drawn through the same aperture through which it has been pressed. Silver requires the least force, but the expansion caused by elasticity continues for several weeks. It appeared probable to Professor Dove that in stamping metals something similar would take place, and that medals of different metals, stamped in the same die, would be of different sizes. This would be most readily seen in those medals in which the impression is symmetrically arranged in reference to the edge, as is the case with the medals of the French Exhibition, in which the coat of arms encircle the French eagle in the middle. One of these in silver and one in bronze were placed in the stereoscope, the eagle being fixed in the middle. After some time the stereoscopic combined medals were seen in the form a hollow escutcheon, and of the colour of an alloy of the two metals. Evidently the reason of this lies in the nonius-like shifting of the individual lines of the impression. This same result was also obtained by the professor with large gold and silver medals, which were kindly entrusted to him from the royal mint in Berlin. It was probable that medals obtained by casting would show the same thing, and this was found to be the case with tin, bismuth, and lead, the casts in which were beautifully executed by Professor Kiss. The account from which the above is derived appeared in *Poggendorff's Annalen*, and also in the *Philosophical Magazine* for the present month. Hiero's crown led to the use of specific gravity to detect an adulteration. The stereoscope is a new means.

Two recent patents bearing upon photography may not be without interest. The first is for an improved method of producing documents suitable for bank notes and other instruments of value, in order to prevent forgery thereon. This invention consists in the employment of paper having an irregular surface, as ornamental pressed paper, or of paper manufactured with a moveable or variable watermark, and upon these marked portions of the paper some part of the design, as the vignettes, words, or denominations, is to be produced by a photographic process, either directly or indirectly. The inventor employs any of the usual modes for the manufacture of paper of a suitable quality for bank notes, cheques, or other instruments, as the case may be.

The other patent is for stereoscopes, sterescopic pictures, and cameras for taking the same, and is taken out by Mr. Swan, of Bishopsgate Street Without. The patentee constructs stereoscopes with prisms, or lenses, of different magnifying powers, that is to say, the prism or lens opposite one eye exceeds in magnifying power the prism or lens opposite the other eye, and he uses such instruments in conjunction with pictures in which the two sides forming the stereoscopic combination are of different sizes, corresponding with the different powers of the prisms or lenses opposite the two eyes; and these pictures, according to this invention, are connected together by attaching them both in suitable positions to the same mounting. In this manner, by the use of one large picture only (the other being small), the patentee is enabled to obtain stereoscopic effect combined with minuteness of detail such as a large picture alone can give, and he is also enabled to arrange the instrument in a form which is more convenient than that of the instrument heretofore employed for viewing large pictures.

Some curious experiments have been made by Dr. Gladstone on the mercurial electric light, and by him communicated to the *Philosophical Magazine*. Mention was made in our last of the unnatural effects which were seen when this light shone on coloured object, and these results of Dr. Gladstone seem to corroborate what Mr. Crookes has already found out. The doctor states that flowers, dyed wools, ribbons, &c., are generally altered in colour, but that the following substances of known composition are more instructive in the contrast between the colours they then exhibited, and those they display by daylight. Crystals of protosulphate of iron appeared absolutely colourless instead of pale blueish green. The blue sulphate of copper, and the yellow chromate of potash, were only enhanced in the brilliancy of their colours. Bichromate of potash became of a yellow instead of a red orange, and dull instead of bright. Red prussiate of potash showed a yellow powder and dingy orange crystals. Chloride of cobalt gave a dirty brown instead of a pale red solution. Nitrate of chromium, though in such strong solution as to appear red by sunlight, was only dark green. Amorphous phosphorus showed scarcely any red or other colour, but presented a dark metallic appearance. Iodide of mercury was not scarlet, but of a brown colour, very glistening, suggesting the idea of scales of tarnished silver. Gold looked like brass. Cochineal in aqueous solution appeared violet in a thin stratum, red brown in a deep one. A decoction of coffee with milk, as usually drunk, assumed a dirty green hue. A solution of bisulphate of quinine, uranium glass, and certain diamonds exhibited the phenomena of fluorescence more beautifully than by sunlight. Among substances that had much the same colour by daylight and by the mercury flame, we may mention blue cobalt salts, yellow nitrate of uranium, green chlorophylle, purple aniline dye, permanganate of potash, and murexide.

Photographic Tourist.*

A FEW DAYS ON DARTMOOR.

Delightful peeps at the valley of the Dart greeted our eyes at every turn of the pretty "Devonshire lane" that led to Holne Bridge, about two miles from the village. From near Holne Cot the scene was particularly enchanting. Below us, the moor-farm, called Hannaford, distinctly mapped out, looked like a garden reclaimed from the wastes surrounding it on every side. Further on, the winding river was spanned by New Bridge, over which towered Leigh Tor. Beyond, the *once* beautifully wooded Chase, and still magnificent woods of Buckland, with the more distant hills, completed a picture which left but little for the eye to desire.

Sir Boucher Wrey possesses a large quantity of land about here, including Holne Chase, the woods of which were once so noted. But the estate being entailed, and Sir Boucher having no son, he availed himself of a right, which his having attained a certain age gave him, of turning the timber into money, and realised a sum of £70,000 for the benefit of his daughters. At least this was the information given me by C—. Well, I must say, that although it was an act of fearful spoliation, yet, under the circumstances, he could not have done otherwise; he would not have been justified in keeping his children out of so large a sum of money for the benefit of one, perhaps a stranger.

Holne Bridge is a picturesque old structure that would furnish good food for both pencil and camera. On the river here, and at every step of the way to Dartmeet Bridge, some six miles up, the scenery, in my opinion, is more beautifully grand than on any other part of this charming river. The pleasure of describing it to you, I must leave for another occasion, for I hope, perhaps next summer, again to shoulder my knapsack and camera, and "tramp it" over the moors, when the upper Dart will most certainly be marked down in my route.

The first gate to the left after leaving the bridge put us on a path which crossed a meadow and led us up through Buckland wood to a farm-house, where, according to instructions given to us at Holne, we were to make enquiries as to our way to the Rock. Here I was not a little surprised to see a gallant rifleman, mounted on a bony plough-horse, about to proceed to the neighbouring town of Ashburton, to his weekly drill. Being a brother in arms, we entered into a discussion purely of a military nature, and I am sure that the ladies of England, that is, those who do not desire foreigners for husbands, will be delighted to learn that the opinion of this son of Devon was most decidedly opposed to the remotest chance of a French invasion. From him we got the information required, and experienced no difficulty in following his instructions. On our way we passed one of those well known notices, "Whoever is found trespassing, &c.," which had evidently caught the attention of some sportsmen, who, perhaps, finding game scarce, determined to get a little practice, by hook or by crook, and so made a "cock-shy" out of this poor board, for there were three distinct traces of charges of shot which had taken effect on it.

Awsill, or Hazel, rock, is a tor commanding a most extensive view both towards the moor and over the champaign country. Far away south, Brent Hill, our starting-point that morning, was distinctly visible, and from thence we could trace the whole distance of our long circuitous route, up the vale of the Avon, round by the Puppers, Holne Ridge, and Holne Lee, to Holne. In front, the house and grounds of Holne Chase on one side, and Buckland on the other, with Leigh Tor, Holne Cot, Benjay Tor, and the more distant hills closing on each other in quick succession, presented a scene on which I could have gazed for hours. Behind us the town of Ashburton peeped out from between the hills, and the eye lost itself in almost endless expanse of corn-fields, meadows, woods, and orchards, dotted every here and there with villages and hamlets. From Buckland Beacon, close by, I should think a still finer, although very similar view might be got; but ascending it was out of the question, the day being far advanced, and night's shades were fast cutting off the distant hills from our sight.

Regaining the road, though very loth to part, C— and I had to say "good-bye." A long walk of many miles would fall to his lot before he could reach his home beneath that hill, now scarcely to be outlined. I trust that we may yet have another ramble together.

But I, too, had some miles to go over before I could reach the little village of Withycombe-in-the-Moor, where I purposed putting up for the night. Stepping out, I passed through the *very* small village of Buckland, consisting of Buckland House, a farm, some two or three cottages, and a church. The bells were ringing merrily, but for what reason I could not ascertain, as I did not see a single soul or any sign of life about. I cannot help thinking that the ghosts of old moormen bellringers were having an evening's spree.

About two miles further on, where a bridge crosses the Webber river, I had to inquire my way at a cottage. Fancy poor, weary me, toiling up the steep hill leading from the river, in darkness so intense that I had to hold my tripod stand before me, as though I were charging an unseen enemy, to save myself from running against the hedge; and then, after half a mile of this toilsome work, being thrown entirely out of my reckoning by the road branching off in two directions. I first took the one to the right, but not being satisfied with appearances, returned and tried the other, with no better result. Nothing, therefore, remained but to retrace my steps and get more explict information at the cottage; so placing my camera and knapsack behind a tree, I soon reached the bottom of the hill and learnt that the road to the right was the correct one. These word-of-mouth directions always puzzle one; you forget one half told you, and don't understand the other. Nothing like a good map and daylight. In consequence of this delay it was ten o'clock before I reached Withycombe, and nearly all the inhabitants were, of course, in bed. Observing a light in a cottage window, I knocked at the door, when it was opened by an old woman, who no sooner saw me than she slammed it in my face, and bolted herself in; she evidently thought me a robber or a ghost. After some trouble I discovered the inn, and knocking the people up, got some bread and cheese and cider, and retired to rest tired enough. I slept well that night. I wonder how C— got on.

M. H.

(*To be continued.*)

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* Continued from p. 258.

Critical Notices.

Microscopic Photography: its Art and Mystery. By James Nicholls. London: Frederick J. Cox.

This is a book which will, we believe, be hailed with pleasure by many lovers of photography. It is a somewhat singular fact that, interesting as this branch of photography must be to the scientific amateur, any practical knowledge of, or skill in, the manipulations of microscopic photography is limited to very few persons, arising probably from the fact, as the author of the work before us observes, that "the few who have succeeded in the practice of an art which comes so much nearer to the minutiæ of nature's handiwork than anything hitherto known, have not been very communicative of the principles which govern it, and it may reasonably be supposed that, unless such a monopoly be broken through, this vast museum of curiosity and interest will remain only half explored."

Mr. Nicholls has here gone fully into the subject, minutely describing the various instruments that may be used, with their respective advantages. The modes of applying sunlight, diffused daylight, and artificial light, are also fully considered, as well as the kind of pictures desirable for reproduction. The utmost minutiæ of the various manipulations, and the reasons for them, are explained with great clearness; the arrangement of the apparatus being shown by diagrams.

If the work have a fault it is one of excess, and not of shortcoming. In his anxiety to explain every possible mode of manipulation that may be used, the writer has risked puzzling the tyro with too much choice. This, is however, a defect which will readily be pardoned by the "intelligent reader," to whom, of course, all books are addressed. Mr. Nicholls is evidently an enthusiast in this branch of the art; the products of which he suggests may be made to form the moulds of waistcoat buttons, or "let six deep into the jewelled bracelets of patriotic demoiselles," by which means "the most reprehensible number of *Punch*, or the most suggestive leader in the *Times*, may yet pass easily the best guarded barriers in Europe."

The A B C of Photography. Twelfth Edition. The London Stereoscopic Company, Cheapside.

This little manual possesses many of the most important essentials of a first book. It is written in a clear, simple, and concise style, well calculated to interest and enlighten a beginner. The general principles on which photography is based are stated in a pleasant and popular manner, and those processes only, most suited for the initiation of the tyro, are selected for detail and explanation. We are somewhat disappointed, however, when we examine the details of various manipulations, which, in some cases, appear inaccurate or inexact; and in others, they are based on exploded theories, ignoring the photographic progress of the last few years. To illustrate what we mean as to the former class of errors, we may mention that in speaking of glass positives it is stated that, for the collodionized plate remaining in the nitrate bath "four minutes is a minimum;" "but a longer time, say to the extent of a quarter-of-an-hour or more, is seldom hurtful." It is a well-known fact to positive operators that, as a general rule, four minutes is a maximum period for the plate to remain in the bath, and all brilliancy will be sacrificed if it be allowed to remain many minutes longer. We are further told that positives may be readily tinted "by stippling on dry colours with soft brushes, and using moist colours for the high lights and any small effective touches." Such instructions for colouring positives could only have been given by one who had never attempted to put them into practice. It is to be regretted also that in a work of this kind, which has reached its twelfth edition, no mention is made of bromides in negative collodion of iron development of negatives, nor of alkaline gold toning. These errors in detail are the more to be regretted seeing that the work is in many other respects so excellent, and some of its instructions so sound. The "hints on portraiture" are full of judicious remarks; here are a few of them:—

> "The position of a sitter, while it has generally the least attention paid to it by the amateur, is really the most important matter in photographic portraiture; be the photograph ever so clear, sharp, and well-balanced in light and shade, ever so beautiful in tone, or correct as a likeness, the production is valueless, unless it be accompanied with a graceful and characteristic *pose*; rules without examples can scarcely afford any assistance, and little more can be done, in a work like the present, than to draw the operator's attention to the subject, and to recommend him, if he wish to excel in this branch of the art, to study the many accessible works on art and composition, as applied to portraiture.
>
> "With a view to their avoidance, a few of the most common enormities may be enmerated:—a stout old gentleman is often placed leaning far back in his chai, and, in consequence, his portrait represents him as being three times stouter than he is, and graces him with an iodiotically small head; he has a hand on each hip, so as to form exact angles on either side, and give him the appearance of a geometrical problem;. his body is turned to the left, his head to the right, and his eyes vacantly staring in a direction between the two. Again: a tall, thin lady is made taller and thinner by being taken in a standing position; having a good shaped nose, a full face portrait is 'done,' and the outline of the nose lost; having fine eyes, she is made to look up, down, or in such a direction that their beauty may be lost. Groups are frequently seen with the sitters forming it either straggling all over the picture, or else arranged with mathematical precision in a straight line, as if with a desire to emulate the position of the youthful and hilarious butchers of the legend—'all in a row'"

We shall hope to see the minor shortcomings to which we have alluded, and which slightly mar an otherwise valuable manual, amended in a future edition, which we hope may soon be called for.

The Shipwrecked Mariner: a Quarterly Maritime Magazine. London: George Morrish.

It is a somewhat odd circumstance that a work like the one before us should be sent to a photographic periodical for notice. Without finding it necessary, however, to recall the apothegm of the ancient sage, that being men, all that concerns humanity should concern us, we find much in the journal before us to interest the scientific reader. An excellent paper on the use of the barometer and its indications—is well worth attention. Photographers, as well as seamen, are often desirous of being weatherwise; for their benefit we extract the following:—

> "Signs of Weather.
>
> "Whether clear or cloudy, a rosy sky at sunset presages fine weather; a red sky in the morning bad weather or much wind, perhaps rain; a grey sky in the morning, fine weather; a high dawn, wind; a low dawn, fair weather.
>
> "Soft-looking or delicate clouds foretell fine weather with moderate or light breezes; hard-edged, oily-looking clouds, wind. A dark, gloomy, blue sky is windy; but a light, bright blue sky indicates fine weather. Generally the *softer* the clouds look the less wind (but perhaps more rain) may be expected; and the harder, more "greasy," rolled, tufted or ragged, the stronger the coming wind will prove. Also, a bright yellow sky at sunset presages wind; a pale yellow, wet; and thus, by the prevalence of red, yellow, or gray tints, the coming weather may be foretold, if aided by instruments, almost exactly.
>
> "Small, inky-looking clouds foretell rain; light scud clouds, driving across heavy masses show wind and rain; but if alone, may indicate wind only.
>
> "High upper clouds crossing the sun, moon, or stars in a different direction from that of the lower clouds, or the wind then felt below, foretell a change of wind.
>
> After fine clear weather, the first signs in the sky of a coming change are usually light streaks, curls, or wisps, or mottled patches of white distant clouds, which increase, and are followed by an overcasting of murky vapour that grows into cloudiness. This appearance, more or less oily or watery, as wind or rain will prevail, is an infallible sign.
>
> "Light, delicate, quiet tints or colours, with soft, undefined forms of clouds, indicate or accompany fine weather; but gaudy or unusual hues, with hard, definitely-outlined clouds foretell rain, and probably strong wind.
>
> "When sea-birds fly out early and far to seaward, moderate wind and fair weather may be expected. When they hang about the land, or over it, sometimes flying inland, expect a strong wind, with stormy weather. As many creatures besides birds are affected by the approach of rain or wind, such indications should not be slighted by an observer who wishes to foresee weather.
>
> "Remarkable clearness of atmosphere near the horizon, distant objects, such as hills, unusually visible; or raised, (by refraction), and what is called "a good *hearing* day," may be mentioned among signs of wind, if not wet, to be expected.
>
> More than usual twinkling of the stars, indistinctness or apparent multiplication of the moon's horns, halos, "wind dogs," (fragments or pieces of rainbows, sometimes called "wind-galls"), seen on detached clouds, and the rainbow, are more or less significant of increasing wind, if not approaching rain, with or without wind.
>
> "Lastly, the dryness or dampness of the air, and its temperature (for the season) should be *always* considered, *with other* indications of change, or continuance of wind and weather."

Six Stereoscopic Views of the Interior of the College Chapel, Eton: F. Jones, Oxford Street.

These views derive their chief value from the subject and its associations. The memorials of Etonians who fell in the Crimean war, which form the subjects of two of the slides will give them a mournful interest in many minds. As photographs they are not quite equal to some issued by Mr. Jones.

Stereoscopic Views of Canada. Montreal: W. Notman.

The lament recently made by the *Times*, correspondent as to the non-existence of stereoscopic views or photographs of the magnificent scenery of Canada, appears to have been written in singular ignorance of the real facts of the case. In addition to the variety of Canadian views included in the series recently noticed, as published by the London Stereoscopic Company, we have before us a catalogue of upwards of five hundred views in Canada, including every class of subject—urban, sylvan, and maritime. Of these a copious selection has been forwarded to us, from Montreal, for notice. Viewed simply as photographs their qualities are very much varied, and some of them inferior to many issued in this country. As pictures, however, they all possess artistic excellence, whilst a few of them we must pronounce as amongst the best, if not *the* best, both as photographs and as pictures that we have ever examined. In these we have natural skies in the utmost perfection. Masses of cumulose clouds driving along in headlong haste, as if to keep pace with the unresting turbulence of the rapids or cataracts beneath, give a singular unity and harmony of wild grandeur that we have never before met with. These heavy stormy skies are suggestive of anything but brilliant sunlight in which to produce the views; and yet they are evidently instantaneous photographs. It would be too much to say that the foliage has not in some instances suffered; but to an extent comparatively trifling when the other advantages are considered. The exquisite beauty of these sky effects should, we think, stimulate photographers to more effort to secure them: white skies, unlike anything ever seen in nature, are the chief defects of English photographs.

SEDGEFIELD'S ENGLISH SCENERY: a Series of Stereoscopic Views. London: A. W. Bennet.

The name of W. Russell Sedgefield in connection with stereographs of English scenery has become a sufficient guarantee at once of their excellence as photographs and of their artistic selection. The additions to the series, before published, consist of views in or about Hastings, Dover, Deal, Ramsgate, Margate, Canterbury, Rochester, Rye, &c. The familiar interest attaching to these places as summer resorts will ensure a large demand for the pictures.

Dictionary of Photography.[*]

PRINTING—*continued*.—The prints having been sufficiently washed are now to be removed to the toning bath of alkaline gold solution. It is important to remark here that although various formulæ have been given for the preparation of alkaline gold toning baths, they have but one purpose: that is, the entire neutralising of any acid that might exist in the chloride of gold, or in the print. So far as our experience has enabled us to determine, the various salts of soda added have no effect in the toning; whether the carbonate, the phosphate, the biborate, the citrate, or the acetate be used, the object is the same. It is true that in regard to the letter two salts, some effect on the colour of the prints has been observed, Mr. Hardwich asserting that the citrate, and Mr. Hannaford that the acetate have a decided effect in influencing the colour of the reduced gold. On this point our own experience has not led us to speak with certainty. The formula proposed by Mr. Maxwell Lyte has been used with the most general success. It stands as follows:—

Chloride of gold ... ... 1 grain.
Phosphate of soda ... ... 18 grains.
Water ... ... 4 ounces.

Another formula, which in our hands has produced equally good results, stands thus:—

Chloride of gold ... ... 1 grain.
Carbonate of soda ... ... 5 grains.
Water *quantum suff.*

Either of these formulæ may be used; and it may be important to remark here that the quantity of water to be added is unimportant, and must be regulated by the size of the dish used, and the number of prints to be inserted. It is better to have a large quantity than a small quantity, the only effect of diluting being to render the process of toning a little slower, which in most cases is an advantage in using the alkaline gold toning bath, as preserving the exact tone more under the discretion of the manipulator. There is less danger, moreover, in using a large quantity of water, of producing irregular toning from the prints sticking together, or the solution not having free access to every one. As regards the respective advantages of the two formulæ given, the chief practical difference will be found in the fact that in some samples of paper the size is very readily dissolved by carbonate of soda, by which blisters and other annoying results ensue; whereas, the phosphate of soda has not the same effect, or not nearly in the same degree.

It will be found an excellent plan for convenience in manipulating, to keep the chloride of gold in a solution of given strength, say one grain to the ounce of water. In another bottle keep a solution of either carbonate or phosphate of soda of a definite strength, either five of the one or eighteen of the other to the ounce of water. On requiring a bath for use a given measured quantity of each can be added to any convenient quantity of water. No more should be mixed at one time than is required for immediate use, nor than is sufficient to tone the number of prints in hand, as the solution should not be used twice. More certainty and less waste is the result of this method than would arise if an indefinite quantity were mixed: it should be remembered that one grain of gold will tone six or eight whole-plate prints. It will be found to materially facilitate the process of toning if the extra water added to make sufficient bulk of the solution be warm or even moderately hot. This method of warming solution will be found a material advantage in cold weather, as it is a much simpler method, than heating the solution in a capsule over a spirit lamp, in the manner sometimes recommended.

The prints on being placed in the toning bath should be kept moving about and prevented from sticking to each other. The whole process should be conducted of course in a yellow light, but the occasional momentary examination by a subdued daylight is not injurious, and is necessary to ascertain with anything like certainty the progress of the toning, and decide when the right tint is obtained. The colour in the toning bath should be a little deeper than is required in the finished print, as more or less of depth is generally lost in the fixing bath of hyposulphite of soda. The extent to which this loss will take place varies so materially with the quality and preparation of the paper that no rule can be laid down, more or less of variation being found in every sample. Experience of the behaviour of the sample of paper under treatment, will be necessary to guide the manipulator in this respect. If a purple black be desired, it will generally be necessary to carry the toning to a blue black in the toning bath; if a purple or purple brown be desired, the tone should reach a deep purple before removing. If removed too soon, the print will appear too foxey; if it remain too long, the tone will appear of a cold, blue, slaty tint, having a washed-out effect, materially destroying the vigour of the print.

On removal from the toning bath the print should be washed for a few minutes in clean water and then placed in a fixing bath made as follows:—

Hyposulphite of soda ... 1 ounce.
Water ... ... 5 ounces.

With some samples of paper, the saxe papers for instance, a weaker solution may be used; but for for highly-sized and highly-albumenized paper it is not safe to use a much less proportion of hyposulphite of soda; for unless the solution be strong enough to dissolve the hyposulphite of silver, which is formed on the first contact of the print with the fixing solution, the inevitable result is seen in "measly" spots and brown discoloured prints. About ten minutes, or from that to a quarter of an hour will generally be found sufficient for complete fixation, more time being required by a thick, highly-albumenized paper than a paper of the opposite character. If, on examining the print by transmitted light on removing it from the fixing solution, opaque spots are seen, they consist of undissolved chloride or hyposulphite of silver, and indicate that the solution is too weak or has not acted long enough. It is desirable that the hyposulphite solution be used fresh, or if not used fresh every time care should be taken that it be kept neutral, and be refreshed from time to time with fresh hyposulphite of soda. The prints should be immersed a few at a time, and should be kept moving during the process of fixation, on the completion of which they should be removed to another vessel for the purpose of washing.

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[*] Continued from p. 270.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 10*th October*, 1860.

A new process for obtaining direct positives on collodion proposed by a distinguished entomologist and amateur photographer, has excited much curiosity and interest in photographic circles, inasmuch as it involves the recognition of, if not a *new* principle, at least one not hitherto recognised. M. Sabatier's process being given in detail, I must refer you to it for particulars. Of its merits I am not yet in a position to pronounce an opinion, but I have no doubt that some among your host of ingenious operators will soon put it to the test, and favour your readers with their conclusions.

Although the stereoscope invented by Professor Wheatstone has become nearly superseded by that of Sir David Brewster, yet the former possesses merits peculiarly its own, which ought to rescue it from the neglect into which it has fallen. M. Helmholtz, professor of physiology at Heidelburg, has proposed a modification of Professor Wheatstone's instrument, which is so ingenious that I think it worth communicating to you, in the hope that it may again direct attention to the claims of the reflecting stereoscope. It is well known that the further objects are from the eye of the observer, the smaller the angle between the two optical axes becomes. The consequence is that our sight becomes less and less stereoscopic in proportion as the plane upon which objects are situated is distant from the observer. Now, with the instrument contrived by Professor Helmholtz, the impression of relief is obtained in those objects which are situated at very considerable distances. The instrument is composed of two telescopic lenses, placed at twenty-four inches apart from each other, but capable of producing a variable angle together by means of a screw, moving in a little groove. By inclining them at an angle with distinct view, each of the images is reflected at right angles. With the assistance of a mirror or a prism, in the middle of the space comprised between the two lenses; then, two other reflecting surfaces convey the images to the eyes under any desired angle. We can, by these means, enjoy the pleasure of perceiving persons, buildings, or landscapes situated at a considerable distance, with all the relief that a stereoscopic view gives of nearer objects.

Although this instrument was invented and described three years ago by Professor Helmholtz, it has not become adopted. It could doubtless render very great services, especially in exploring expeditions, and voyages of discovery. The few models that have been constructed appear to have been applied only to the amusement of residents in country places, who observe distant moving objects by its assistance.

There is another peculiarity of this instrument worth noticing: by a peculiar adjustment it can be made to represent persons situated at a few paces distant only, as complete caricatures, by an extreme prolongation of every salient portion of their bodies.

The study of stereoscopic illusion is calculated to throw much light upon the phenomena of vision, as well as upon the physiology of the eye. It is necessary to avoid confounding the impression of relief in objects produced by binocular vision, with the stereoscopic illusion obtained by a single eye. This latter often results in fact from an hallucination, either voluntary or involuntary, produced by a violent effort of the mind upon the object which is sought to be seen in relief. Many eminent artists violate the rules of perspective in their pictures, as is proved by geometrical measurement. Yet the eye, instinctively, as it were, corrects the distortion for itself. Most of the architects of our day neglect to take into account the corrections which the phenomena of optical illusion inevitably brings to bear upon the rigid linear outlines of their edifices, however inferior in height they may be: the consequence of which neglect is, that their edifices have a very heavy aspect.

The Greek architects understood this matter well. In the Acropolis of Athens we recognise how perfectly they took into account certain optical illusions previously noticed, but not remedied by their predecessors. The curvature of the colonnades of the Temple of Minerva is calculated precisely to enable the eye to correct the reverse inflexion which a certain number of objects, ranged in a perfectly straight line, appears to assume. These same artists also carried very far the study of the optical illusion produced by colours, in the painting with which they decorated most of their edifices; we can, even now, recognise, notwithstanding the inroads of time, that deep-hued colours were applied at the base, and light hues at the summit. Here they took a lesson from Nature. Now, we know that mountains whose summits are usually covered with snow, and their bases with thick, black forests, appear to rise to immeasureable heights. And it was by such deep, intelligent recognition of natural phenomena that ancient art achieved such inimitable prodigies, which have baffled the powers of imitation of all their successors.

The chemist Bolley, while engaged in researches upon aniline, noticed that although he often found himself in an atmosphere highly charged with chlorine, he experienced no inconvenience. At the same time he remarked that the nasal mucus was of a violet blue colour. From this he was led to conclude that the small quantity of vapour of aniline absorbed by the mucus during his manipulations sufficed to produce the effects described above. In experimenting with the view of ascertaining if aniline respired immediately after the inhalation of chlorine would neutralize the disagreeable and pernicious effects of the latter, he became satisfied that it did so effectually. He, M. Bolley, recommends an aqueous solution of aniline as an antidote and prophylactic to those who are exposed to the effects of the inhalation of chlorine gas.

The easy formation of bromide of cyanogen by the action of bromine upon fulminate of mercury has given M. Leon Schischkoff the idea that we may possibly admit a metallic cyanide into the composition of fulminates. Or in other words, he supposes that the fulminate contains a cyanide combined with a nitrate group.

To satisfy himself on this point, he caused the reagents usually employed to discover the presence of a cyanide to act upon fulminate of mercury: hydrochloric acid was first given off, which disengaged some hydrocyanic acid from the cyanides.

With fulminate of silver, this disengagement of hydrocyanic acid under the influence of hydrochloric acid, is a fact previously established; but in attempting to obtain the same reaction with fulminate of mercury he was at first surprised that he could not obtain an analogous result. He attributes this difference, in this case, to the formation of a mercurial compound of an unknown nature, possessing the property of retaining the hydrocyanic acid in combination. For, if a little ferrous sulphate be previously added to the hydrochloric acid, a very abundant disengagement of hydrocyanic acid is easily recognised. By this addition of the ferrous salt the compound which holds the hydrocyanic acid in combination is probably decomposed.

The fulminates are as poisonous as the cyanides. The energy of their action depends on their solubility, but the symptoms of poisoning are exactly the same as those produced by the cyanides. Thus, the fulminate of zinc, one of the most soluble, is at the same time one of the most poisonous. The isocyanurates are not poisonous. It was desirable to ascertain if this bromide of cyanogen be a product of the direct action of bromine upon the fulminate, or if it be a secondary reaction of the brominitrate product with an excess of bromine. With this view M. Schischkoff repeated several times the reaction between bromine and fulminate of mercury, and under different circumstances the following results were arrived at :—the action of bromine upon fulminate of mercury is not at all so simple as has been supposed, it forms simultaneously, bromide of cyanogen, the bromonitrate compound of M. Kékulé, a large quantity of hydrobromic acid, and several other products which remain to be studied.

In considering all the known reactions of the fulminates, and chiefly those now described, we are led to distinguish in the composition of fulminates, two distinct groups, each containing the portion of carbon belonging to fulminic acid. In the present state of our knowledge of the properties of the fulminate it appears that—

$$C^2\,(NO^2)\,H^2 \qquad + \qquad 2C\,NH$$

Binitrated Ethylene. Hydrocyanic Acid.

very well represents these properties.

If we admit that there is really an addition between these two groups, we arrive at a formula which represents a fulminic acid as directly derived from ethylic alcohol by the substitution of cyanogen for oxygen, and of two equivalents of the group NO^2, and two equivalents of hydrogen.

$$C^2\,(NO^4)\,{}^2H^2 + 2CNH = C^2\,(NO\ )\,{}^2H^4\,Cy^2$$

Fulminic acid.

Ethylic alcohol C H O.

In admitting the new formula for fulminic acid, we very easily explain the formation of fulminates by the action of nitric acid upon ethylic alcohol.

Among the processes followed for bleaching paper-pulp that most in vogue is Didot's, which consists in mingling carbonic acid with the water holding chlorine and lime in solution. Other acids would perform the same office, but then it would be difficult to remove the free acid,which in the course of time, would destroy the substance of the paper impregnated with it. It is now proposed to substitute a salt of zinc for the chloride of lime, by which a much better result is arrived at, for the acid arising from the destruction of the organic matter and the chlorine of lime, becomes saturated by the oxide of zinc as fast as it is produced. Another advantage is that the special gas-apparatus and utensils required by the old process are rendered unnecessary.

A new method of electro-zincing has been proposed by Messrs. Person and Sire, which consists in employing alumina and the salts of aluminum, single or double, in the composition of the baths employed in zincing by the electric current.

Sulphate of alumina may be advantageously employed, but ordinary alum is preferable on account of its abundance. The process is conducted at a temperature of about 60° Fah. with a single element, and a bath formed of ten parts of alum to one part of oxide of zinc. The metal deposited is remarkable for its great adherence to the object covered with it, and leaves the latter in its primitive state of suppleness.

Among the questions submitted to discussion at the late Chemical Congress at Carlsruhe, the following are the most important :—

1st. Is it desirable to establish a difference between the terms *atom* and *molecule ?*

2nd. It is desirable to call *molecule* the smallest possible quantity of a body which can enter into combination or separate from it.

3rd. Is it desirable to designate by the word *atom* the smallest quantity of a body existing in a combination.

4th. Must the term *compound atom* be superseded and become replaced by the words *residue* or *radical.*

5th. The notion of *equivalents* is empirical, and independent of the idea of *atom* and *molecule.*

Upon the first three questions it may be assumed that the scientific world is tolerably well agreed. The chemical and physical molecules are considered as identical. The gaseous molecule represents the chemical molecule. As to the fourth question, no definite conclusion has yet been arrived at. The fifth proposition was adopted *nem-con.*

Three other propositions were submitted to the Congress, viz., 1st. Is it desirable to place chemical notation in harmony with the progress of science ?

This question admits of no discussion, it answers itself.

2nd. Is it desirable to adopt the principles of Berzelius in effecting these modifications ?

It was thought preferable to adopt the reform proposed by Gerhardt.

3rd. Is it necessary to increase the number of symbols now in use by new signs ?

This question was responded to by the unanimous adoption of the barred letter as a symbol of simple bodies corresponding to two volumes.

An immense deposit of fossil remains has been discovered at Lierre, in Belgium, while making excavations for a canal. They consist of the teeth and bones of the mastodon, rhinoceros, deer. horse, and dog, buried in a coarse sand at a depth of 20 to 30 yards below the surface of the soil, and at about 8 feet below the level of the ocean. The bones are all found buried in one spot, as if the animals had been all engulphed at the same time. A careful examination of upwards of 1,000 square yards of the sand excavated yielded no specimens of shells or pebbles.

PHOTOGRAPHY AT SOUTH KENSINGTON MUSEUM.*

John Scott, Esq.; examination continued.

"873. When did you publish your cartoons ?—In the course of the autumn of 1858.

"874. In November ?—Probably a specimen of the first cartoon would be out in August 1858 ; we contrived to get a large demand for them in the autumn of that year ; sometime after that, when probably it was found that the sale at the photographic exhibition did not turn out to be so great as had been expected, then came out this scheme in the interest of the public, and a sale for almost nothing.

"875. Sir *John Shelley.*] Are your house members of the Photographic Society ?—No, neither I nor any of my partners. The Photographic Society will, I believe, take this question up. I think that I have closed my case with regard to the cartoons ; I have shown that we had prior permission to photograph them ; that we were resisted by the Department, and proved that we had a right, and that we published them at a price which Mr. Thurston Thompson followed, there not being a shilling difference in the two prices. Now, the after question is, that the Department of Science and Art came out with a settled scheme in which the cartoons, instead of being sold as Mr. Thurston Thompson sold them at the exhibition, are sold at a price with which it is impossible for private individuals to compete, they having originally distinct permission to photograph them for their schools.

"876. What are the things which are sold at 7*s.* ?—The studies.

"877. What do you mean by the studies ?—When Signor Caldesi began, he gave permission to commence first to Mr. Thurston Thompson. It had occurred to Signor Caldesi to do something which probably might not occur to another person, namely, to make individual studies of parts of the cartoons. Mr. Thurston Thompson commenced first, and he having executed three cartoons entire, gave up the Paul preaching at Athens, to Caldesi. Mr. Thurston Thompson executed them of the sizes given in the catalogue ; one size was 48 by 30, our size being 46 by 30 ; another size was 31 by 21 ; another size was 23 by 15 ; another size was 15 by 11, and another 8 by 5. Mr. Thurston Thompson having executed his cartoons in all their integrity then yielded up the Cartoon of Paul preaching at Athens, to Mr. Caldesi ; he set to work and produced four sets of the entire cartoons ; having done that, he executed, what up to that time, Mr. Thurston Thompson had not executed, namely, individual heads ; Mr. Thurston Thompson's people were about, and saw this. Mr. Caldesi having finished, the cartoon was taken back to its place and another cartoon was got down for Mr. Thurston Thompson, who commenced his operation the next day, and he did with that cartoon what he had not done with the other ; he produced heads as Caldesi had done, and when the photographing was over he had the Paul preaching at Athens taken down and took such such studies of that likewise.

"878. Those are what you call studies ; the heads of the figures being taken large ?—Yes ; then some time last year the Department of Science and Art issued that notice which struck all photographers with dismay, that for the future the Committee of Council on Education had been pleased to enable the public to derive the full advantage of having these copies at a cheap rate.

"879. What was the date of that ?—The date on the face of the catalogue is 1860. The Committee of Council on Education permitted the sale of photographs taken for the Government Institutions. It says, 'First, to enable the public to derive the full advantage from the negatives which have been, or may hereafter be, made officially for the Department from works of art in foreign museums, and in other collections which cannot be photographed by private agency, the Committee of Council on Education has caused an office for the sale of photograph impressions from such negatives, to be established at the South Kensington Museum. Photographic negatives, made by order of the Trustees of the British Museum, and for the War and other Government offices, will also be sold. The following tariff of price for 'positive' impressions has been sanctioned by the Committee of Council on Education:—'For unmounted impressions, a single impression, the dimensions of which contain less than 40 square inches, *e. g.*, five by seven inches, or four by eight inches, 5*d.*; 40 square inches, and under 60, 7½*d.*; 60 square inches, and under 80, 10*d.*; 80 square inches, and under 100, 1*s.* ½*d.*; and so on, adding 2½*d.* for every 20 square inches or under, up to 500 square inches. For prices above 500 square inches see the detailed list. 2nd. The Department does not charge itself with the mounting of impressions, as the public is able to do this for itself, but the agent will afford every information on the subject of mounting. 3rd. Artists, manufacturers, and the public generally, who may desire to have photographs of any special objects in the Museum of Ornamental Art, can order negatives of such objects at the rate of 3*d.* per square inch.' It is utterly impossible for private individuals to produce at this rate. 'Any size under 30 square inches will be charged as 30 square inches; one proof of the negative is included in the charge for the negative. The Department does not undertake to print any further impressions; but they may be ordered from Mr. Thurston Thompson, 7, Gordon Terrace, Kensington, W. 4th. The above terms for negatives will apply to photographs of special objects in other public museums and galleries, such as British Museum, Hampton Court Palace, &c, &c.; but the official photographer will charge his incidental expenses in addition, viz., 2*l.* 2*s.* per day, and travelling expenses.' The authorities granted permission to the department to photograph solely what could not be photographed by private agency, and the first thing the Department did was to enter into competition with a private firm in the production of those cartoons, and by every means in their power they otherwise tried to drive that firm and the whole profession out of the market. In order that I may show the Committee the ramifications of this Brompton business, and how they attempt to monopolise the higher departments of the business of photographers, I will read to the Committee a correspondence which took place between ourselves and the British Museum. Our house has the reputation of having produced some important works in photography, and having that reputation the Imperial Court of Russia, through the Grand Duchess Marie, gave us a commission to photograph the Elgin Marbles. We wrote to Mr. Panizzi to ask his permission to do it. Mr. Panizzi told us that everything in the way of photography in the British Museum had been handed over to the Department of Science and Art, and that therefore he could do nothing; I said, 'Are the trustees to be applied to, because I do not feel disposed to put up with this loss,' for of course it would be a great loss of reputation to us to have it known that we had been refused. I said 'What shall we do?" He said, 'Perhaps you had better write to the Trustees.' I accordingly wrote to the Trustees this letter, dated the 9th March, 1860:—'My Lords and Gentlemen,—We beg leave to inform you that we have received the commands of her Imperial Highness the Grand Duchess of Russia to execute for the Imperial Court a series of photographs, on a large scale, of the Elgin Marbles. We are aware of the regulation by which the photographer of the Department of Science and Art has been appointed photographer to the British Museum. That artist would not, we conclude, refuse to undertake this work for us; but then he, not we, would be the agent of the Court of Russia, and derive the honour and advantage arising from the Imperial patronage, which would be fatal to our reputation: our name is our business. The loss of one involves the loss of both. We have sunk a large capital in photography, with the determination to produce works of more importance than up to that time had appeared. We carried out our intention in the publication of the great series of photographs of the Manchester Art Treasures Exhibition, the Cartoons by Raffaelle at Hampton Court, &c. We would gladly go further in the same path, but we are crushed by the Department of Science, which, working with the public money, not only defies private competition, but also closes the door to private enterprise. We respectfully ask that you will now relax the rule through which an important portion of our business paralysed. We have the honour to be, my Lords and Gentlemen, your obedient and humble servants, *P. & D. Colnaghi, Scott & Co.*' They did relax it, and they gave us permission.

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* Continued from p. 274.

"880. Have you their answer.—Yes, it is as follows: 'British Museum, 13th March, 1860. Gentlemen,—Your letter of the 9th inst. has been submitted to the Trustees of the British Museum, and in consideration of the peculiar circumstances stated therein, I am authorised to allow you to take photographs of the Elgin Marbles, in order to enable you to execute the commission of her Imperial Highness the Grand Duchess Marie of Russia. You will, therefore, have the goodness to place yourselves in communication with Mr. Hawkins, Keeper of the Department of Antiquities, who will make the necessary arrangements for you to proceed with the work, which is to be done under his superintendence. I am, gentlemen, your obedient servant, *A. Panizzi*, Principal Librarian.—Messrs. P. & D. Colnaghi, Scott & Co.'

"881. Sir *John Shelley.*] Between your application to them and that letter, was there a sort of refusal?—Yes.

"882. What was the date of that refusal?—I saw Mr. Panizzi previous to the 9th of March. I wrote him a letter, and he desired me to come and see him. The result of my conversation with him was the letter of the 9th March, which I have read. The permission was given us to take photographs, and which permission we are now acting upon. You see the operation of the Department of Science and Art upon one branch of commerce. Not deterred by all that has taken place, our house, is now, at great expense, and with great labour, thought and anxiety, bringing out a voluminous work of British portraits. We having to live by the sweat of our brow, and to pay our taxes, part of which go to the support of the Department of Science and Art, we are obliged to sell that at a price which will give a fair profit to us. We are going to publish each part, containing five plates, for one guinea, but there is nothing to prevent the Department of Science and Art, when they see our work, saying, 'We will do this in the interests of the public, and we will bring it out at 1*s.* 6*d.* a part.' That is the operation of the Department of Science and Art upon one branch of commerce, which it is their duty to foster and not to discourage. I have looked over their catalogue (for the first time in my life) since I came into this room, my business being to sell my own productions, and not to interfere with others; and I see here that at present the only attack which seems to have been made has been upon photographers. I suppose they thought they were an easy race, who would bear it. I have not had time or inclination to trace the effect of the Department on other branches of production. (*To be continued.*)

Proceedings of Societies.

Glasgow and West of Scotland Photographic Society.

The first ordinary monthly meeting for the season of this Society, was held in the Religious Institution Rooms, on the evening of Thursday, the 4th current, J. Kibble, Esq., President of the Society, occupied the chair.

Mr. J. **Stuart** read a paper on "Printing and Toning on Albumenized Paper." There was a good attendance of members, and a lively conversational discussion followed the reading of the paper, in which the Chairman, Messrs. Jones, Cramb, H. M'Farlane, J. Ewing, Andrew M'Tear, D. Brown, and John Cramb took part.

The subject was announced for further discussion at the next meeting, members being requested to come prepared with the results of their experience, whether successes or failures in printing.

Photographic Society of Scotland.

The annual exhibition of photographs, in connection with this Society, is just announced. Instead of taking place in December as heretofore, it will be held in the months of February and March of the coming year. This will give exhibitors a little more time for preparation, as the winter months may possibly afford better photographic weather than we have had during the summer.

Photographic Notes and Queries.

Preserving Plates for a Short Time.

Sir,—In your publication of the 24th August last, your correspondent "Neg. Devel" inquires in what way plates may be kept a short time after preparation, and this inquiry is followed up by suggestions from other correspondents. If I am not too late in the field, and a hint from a humble enthusiast in the "black art" will be of any service to your numerous readers, permit me to state my experience in that line. I am frequently in the habit of taking a stroll a little way out of the dust and smoke of the town, and my pipe and camera are my companions. I coat my plates with Keene's negative collodion, to each ounce of which I have added about a drachm of alcohol; sensitize in a 35-grain bath, wash well in a dish of distilled water, sally out for a ramble, expose with a lens 8 inch focus ¼ stop one minute, in bright sunshine. On my return (generally about an hour or nearly so), I redip the plate in the bath. Develop with pyrogallic acid, to which, if necessary, I add a few drops of silver solution; fix with hypo, bleach with bichloride of mercury, and intensify with a weak solution of iodide of potassium; of course washing between the application of the different solutions. The only drawback is a desire on the part of the film to leave the plate, which probably, Mr. Editor, you or some of your talented correspondents can show me how to overcome. I enclose you a print by which you will be best able to judge of the merits of the process.—I am, yours very respectfully, W. R.

[The print is excellent, and proves the process to be very successful. Avoid the use of hydrochloric acid in making the bichloride solution, and the tendency in the film to leave the plate will be lessened.—Ed.]

Keeping Alkaline Gold Toning Baths.

Nailstone Rectory, Oct. 10*th*, 1860.

Sir,—Will you favour me by answering, through the medium of your valuable paper, the following questions:—1. Can a solution of chloride of gold, with distilled water, be kept for any length of time without deterioration, as in your formula of the alkaline gold toning process you state that when the carbonate of soda is added it must be used freshly made. 2. How long should the print be kept in the hypo solution in the same process. 3. How can black varnish be removed from the back of positives.—I am, &c. N. C. Camm.

[1. The chloride of gold may be kept in solution for any length of time. It is better kept in the dark. The salt of soda should be added at the time of use, as if the two are kept mixed decomposition is apt to ensue. 2. About ten minutes or a quarter of an hour in the hypo-solution is generally sufficient. See remarks on the subject in article "Dictionary of Photography," in the present number. 3. Turpentine or benzole is the solvent of most of the black varnishes in the market. The varnish is easily removed by a few drops of either.—Ed.]

Talk in the Studio.

Photography for Bank Notes.—M. Joubert is engaged on some experiments for the application of his printing process to bank notes, as an additional security against forgery. The desiderata for this purpose are that the process shall be difficult to imitate and easy to detect. M. Joubert thinks he will be able to meet these requirements.

Latter-day Duties.—Mr. Charles Dickens has recorded, remarks *The Times*, as his latest observation of metropolitan life, that three things in this modern age, and this vacation season, appear to be clamourously required of man in the streets of London :—First, that he have his boots cleaned : secondly, that he should eat a penny ice ; and thirdly, that he should get himself Photographed! If many of the complaints we have heard of the state of metropolitan photography, as a profession, this vacation season, be correct, this last mentioned important item in this whole duty of metropolitan man has been woefully neglected.

Stereoscopic Indecencies.—An extensive seizure, under Lord Campbell's Act, of indecent stereographs, pictures, &c., was recently made in Holywell Street. The whole were ordered to be destroyed, by Mr. Henry, the sitting magistrate at Bow Street.

Direct Positive in the Camera.—A singular illustration of the "exceptional phenomena" which not unfrequently puzzle the photographer, was related the other day by a friend, who is a very successful manipulator in the Fothergill process. Some plates prepared by this process had been given into the charge of a non-photographic tourist who was visiting Wales, with definite instructions for their exposure, &c. The plates were brought back for development, and were for the most part, from some cause, failures, no picture at all appearing on development. With one plate, however, the case was different ; it developed perfectly, but produced, instead of a negative, a good transparent positive ; the lights being quite clear and transparent, whilst a black deposit of silver was on the shadows. No daylight could come in contact with the picture during development to produce this effect, as it was developed at night. As the history of the plate during its travels is unknown, no conjecture as to the cause of this singular result can be offered.

"Zeitschrift fur Fotografie und Stereoscopie."—This is the title of a new German photographic journal recently issued at Vienna. Reports of the various meetings of English metropolitan and provincial photographic societies are translated into its pages. A part before us contains three excellent specimens of photo-lithography, the first being an ornamental design, the second a map, and the third a copy of one of Rembrandt's etchings. They are produced by the process briefly described by our German correspondent in a recent number. Altogether they are the best specimens of the art we have seen.

Fraudulent Lenses.—Our readers will perceive an advertisement in the present number headed "Caution! T. Ross, Optician," &c. We have reason to believe that there are more of the spurious lenses, which are, doubtless, for the most part of the most worthless construction, in circulation than is generally imagined, and as almost all photographers, whatever their attainments in the art, upon first using such a lens, and failing to produce a good picture, will sooner look with suspicion upon his chemicals than upon a lens bearing the name of Ross as maker ; this becomes a question of serious importance. We are informed that Mr. Bartrum, a pawnbroker, recently sent to Mr. Thomas Ross for the verification of a lens, upon which an advance of cash was desired. A few moments examination proved it to be a fraudulent imitation. The perpetrators of these gross frauds are evidently not opticians, although they may be good workers in brass ; for the lens sent to Mr. Thomas Ross actually had the convexity of the front combination of lenses fastened into its cell the wrong way. Mr. Thomas Ross, who has had the manufacture of the Ross lenses for many years entirely in his hands, at once detected the forgery, and intends, we understand, if opportunity occur, to publish the names and addresses of the unprincipled traders who have lent themselves to this fraud ; steps for their discovery being already in progress. Our readers will see, by the latter part of his advertisement, that he invites a submission of lenses to his examination and identification, which the photographic world will not be slow to appreciate.

To Correspondents.

A. F.—Citric acid must be used much more sparingly than acetic acid. About one grain to the ounce of developing solution containing two grains of pyrogallic acid is sufficient.

X. Y. Z.—The feeble effect you describe in your glass positives is probably owing to your black background. What ever can induce you to use a background so unnatural, inartistic, and unpleasing? It will have the effect of completely "killing," the delicate shadows of the face and give it the flat feeble appearance of which you complain. Either white or black are unsuitable for the purpose. A grey which is darker than the lights, and lighter than the deepest shadows in your picture will give the best effect. Try brown paper ; there is some made, a yard and a half wide and of any length, which will answer the purpose admirably.

Thos. Mercer.—We should say the paper is everything you can desire, the surface is good, and the tone excellent, altogether producing a good picture.

P. P. S.—We are obliged to you for calling our attention to the subject. You will see, however, on reference to p. 192 of the present volume, that the alleged "wonderful invention" is a gross imposition, little short in fact of a swindle.

Not Quite up to the Mark.—Your signature is a misnomer, as the print sent is quite up to the mark. It is a charming artistic little picture, well selected as a view, and at the same time good as a photograph. We shall be glad to see the further specimens to which you refer. An answer was written when we first received your letter ; but by some mistake of the printer its insertion was neglected.

John Crabtree.—You will have great difficulty in removing a spirit varnish from a positive photograph in order to turn it into a negative. You may try as follows :—First remove the black varnish by means of turpentine or benzole, in which it will probably be soluble. When that is done, repeatedly flood the surface with absolute alcohol. If you value the picture do not risk it; but produce a negative by copying with the camera. Aqueous solution of iodine is made by dissolving iodine in water ; if a little iodide of potassium or other alkaline iodide be added to the water it will dissolve a considerable proportion of iodine.

Jas. S. G.—Your only method will be printing by development ; details of which have appeared in various former numbers. Try Mr. Hooper's process, referred to at the meeting of the Chorlton Society, reported in our last. Our Dictionary of Photography will shortly have some details on the subject.

A Subscriber.—The name is doubtless as you conjecture, German ; but we are not familiar with it ; nor can we say of what repute.

Ediom J.—Your negatives are a little hard. Expose a little longer.

W. F.—The use of pyrogallic acid with a little nitric acid for developing positives is infinitely inferior to the protosalts of iron for the same purpose.

Peto.—A short focussed lens is more rapid in action than one with long focus, but it is not so well suited for groups in portraiture.

A. B.—Twenty-five grains of silver to the ounce of water is too weak, Thirty grains at least should be used. Thirty-five are better.

T. D. B.—The glass shapes referred to as guides in cutting photographs to the patterns desired are not manufactured for sale, so far as we know. They can be easily made by the photographer himself, or by any glass cutter or glazier to order. An approximation to the right shape should be cut first with a diamond, and the superfluous edges then chipped away by means of a pair of pliers or "shanks," as described in the article "Amateur Mechanic," on pages 136 and 148 of our third volume. The edges may then be ground smooth on a grind-stone.

S. R. G.—The specimens sent are very excellent ; and if all the subjects are interesting, we should think that you will have little difficulty in selling them. Your best plan would be to communicate with some of the large publishers of stereoscopic and other photographs, whose names you will see in our advertising columns Should we hear of any especially likely we will let you know by letter. We should be glad to have a few particulars of your printing and toning process. Do you use the alkaline gold bath?

W. H. J. G.—We are obliged by the description which has come to hand and will appear shortly. We should be glad to see one of the dark slides. Do not try to get white skies, which are utterly untrue and inartistic : a little "printing through" will give the charm of atmosphere which is so generally wanting. 2. We do not quite understand whether you mean that the lens does not cover in copying, or that you cannot manage the focussing for the size you require. For copying, the body of your camera will, of course, require extending just in proportion to the size of the copy required. If you wish the copy to be the full size of the original, the distance between the lens and the ground glass must be the same as the distance between the lens and the object to be copied. You can improvise a mean of extending the body for temporary purposes by means of a piece of black cloth.

Jos. Beldon.—Your stereos are good, and subjects interesting. They would be improved by a little more detail in the foliage. This might be secured by a little longer exposure, or the use of bromine in your collodion. 2. In enlarging as you propose, the negative must be placed in a dark box or other contrivance, so as to cut off all light and prevent any rays entering the camera, except those passing through the negative. With this precaution and careful manipulation, you may succeed in enlarging as you describe, without serious loss of definition.

Minster.—We are not aware of any practical application of artificial light to the production of photographs in the camera, except Mr. Moule's photogen. Various experiments have been made with partial success ; but none reduced to a practical issue for general use.

Photo-Room.—Fluted glass will obstruct more light than plain sheet glass, and will cost more. We do not quite understand your question as to the distance from the background. You must be more explicit, and we then can answer you. Take care to give your roof sufficient "pitch." Glass houses, the roofs of which have insufficient slope, have suffered terribly this summer.

Thickhead should have perceived that the paragraph in question was quoted by our Parisian correspondent from one of the French journals, and all the details given as in the original. A little experiment may be necessary to determine the best proportions. Try "parts" in grains.

Matthew Handscomb.—See under head of "Notes and Queries" in our last.

THE PHOTOGRAPHIC NEWS.

Vol. IV., No. 111.—*October* 19, 1860.

DANGEROUS CHEMICALS.

Perhaps there are few professions connected with the arts of peace, which involve the daily use of so many dangerous and destructive agents as photography. Corrosive acids, caustic alkalies, and deadly salts are its constant familiars. Whilst the dangers consequent upon the indiscriminate sale of poisons have been for some years past constantly impressed upon the public mind, and ingenuity has been taxed to the utmost to enact precautions, and provide bottles of different colours and shapes in which poisons should be vended, the photographer has been able to purchase, unchallenged, cyanide of potassium bichloride of mercury, and other equally fatal agents sufficient to poison a colony.

With the deadly and poisonous nature of his chemicals taken internally, the photographer is, however, for the most part perfectly familiar; but there is another danger with the imminence of which, it often strikes us, he is not so much impressed, and to which a recent case, brought before the Lord Mayor for adjudication, calls our especial attention: we refer to the dangerously explosive and inflammable nature of sulphuric ether and its vapour, and also, of course, of collodion.

The facts of the case to which we refer were simply these: —A merchant was charged by the Peninsular and Oriental Steam Navigation Company with having shipped on board the "Pera" certain cases of nitric and sulphuric ether, without distinctly marking on the outside the nature of the contents, and specifying them as dangerous, and thus neglecting to fulfil certain conditions of the Merchant Shipping Act. The cases which had been received on board in due course were marked "glass," and described "apothecary wares." From some cause, one of the bottles had got broken, and the leakage from the case soon made itself apparent from its powerful odour. This fortunately occurred before the vessel sailed; had it occurred during the voyage, and a flame of any kind come in contact with the vapour, the results might have been too frightful to contemplate. To explain and illustrate the exact nature of the danger which this neglect on the part of the shipper might have involved, Dr. Letheby was placed in the witness-box; we subjoin his evidence:—

"From the course of my scientific inquiries I am acquainted with the properties of *spiritus etheris nitrici*, or, as it is popularly called, sweet spirits of nitre. It is a mixture of one part of very volatile ether, called *hyponitrous ether*, and four parts of spirits of wine. You cannot freeze it. Its specific gravity is about 2-10ths less than that of water, or as 8 to 10. It mixes with water, but has a tendency to float unless agitated. It is volatile at ordinary temperatures. The pure ether itself boils at a temperature of 70 deg., which is below the temperature of a ship's hold in a warm climate. The spirit of nitre begins to boil at a temperature of 130 deg., and gradually rises to 170 deg. There would be two effects from the leakage of a vapour so compounded mixing with the atmosphere—first, the injurious effect to those inhaling it, for, like chloroform, it is a powerful agent in producing insensibility, and it will take fire at a point several yards away from the surface of the liquid which I can prove by an experiment. (The witness put into a dry quart bottle in court about 20 drops of the spirit of nitre, and in a few minutes the vapour diffused itself through the atmosphere of the bottle. He then applied a light to the mouth of the bottle, when a sheet of flame passed through the liquid to the bottom of the bottle with a slight explosion.) If it mixes with about 30 parts of atmospheric air, I find it forms a most powerful and explosive compound. A gallon of the liquid spirit of nitre will produce about 400 gallons of vapour, and this with 30 times its bulk of air would form 2,000 cubic feet of a powerful explosive mixture. The spirit of sulphuric ether, commonly called Hoffman's anodyne, is a mixture of one part of pure ether and two parts of rectified spirits of wine, with a little essential oil of wine. Its properties are essentially the same as the other. It is a powerful narcotic. The spirit of nitric ether is a little more volatile than the sulphuric ether. I can form an opinion as to the temperature of a ship's hold on a voyage to India. Cases packed like the one in question, and containing such articles, I think would be dangerous things in a warm place in the hold of a vessel. If by any chance they were placed near the engine-room, where the temperature was high, the spirit might reach the boiling point and burst the bottle."

Dr. Letheby further stated, in cross-examination, his conviction that—"If a case so packed as was the one in question were exposed in the hold of a vessel to a temperature of 90 deg. it would be a mere question of time—of a few hours or days—for the heat to reach the bottle."

The bottles in question, it appeared, were simply packed with straw in the cases, and it transpired in court, that thousands of pounds of the same and similar chemicals are sent out from Apothecaries' Hall, packed in the same manner; it was also admitted that the packages containing these bottles were knocked about in the most careless way on the wharves. "From all this we must needs infer," observes the *Times*, "that these most frightful risks are of no uncommon occurrence, and that many a steamer starts on her voyage with the elements of destruction below her decks. Most justly did the Lord Mayor rule, notwithstanding this evidence, that the provisions of the law had been violated, and most judiciously did he express a hope from the bench that this case might operate as a public warning. It is shocking to think of the danger thus gratuitously added to the ordinary perils of the deep. In the jar shipped on board the "Pera" was a whole gallon of the nitre spirit. This quantity of the compound would have produced, according to Dr. Letheby's estimate, 400 gallons of vapour, which, by its chemical combination with the atmosphere, would have formed '2,000 cubic feet of a powerful explosive mixture.' Why, there must have been force enough to blow into the air all our five steam rams at once. No iron-cased frigate could have withstood such a power."

We have not much opportunity of judging of the manner in which cases of photographic goods, usually containing collodion, if not ether alone, are packed for shipping: we have reason to believe it is in many cases carefully done, but we have often been struck with the careless manner in which such things are kept and handled in the operating-room of the photographer. Bottles of collodion and bottles of ether are commonly kept untied down, notwithstanding the frequent occurrence of the stopper being blown out by a slight elevation of temperature, thus allowing the escape of an inflammable vapour, which increases to two hundred times the bulk of the liquid; gun-cotton is kept with the slightest possible care; we have seen it in paper parcels loose in a drawer containing a heap of papers. Happily cases of accident from this cause, notwithstanding the carelessness to which we refer, are very rare. Occasionally a fire occurs, as in the laboratory of Mr. Sutton, of Jersey, a year or two ago; but there are few cases on record of serious accidents, and still fewer of fatal result. Familiarity with danger and long immunity from painful consequences, breeds indifference, if not contempt. The danger, however, is not the less real, nor the consequences less imminent, and we trust that the startling nature of the danger, as put into detail by Dr. Letheby, will induce photographers at large to greater caution in the use of these and all dangerous chemicals.

DR. HILL NORRIS'S NEW SENSITIVE DRY PLATES.

We have recently received from Dr. Hill Norris a packet of dry plates prepared by his new process, for giving sensitiveness equal to that of wet collodion. Regarding the means by which they are produced we have no information; nor can we, seeing that the perfection of the process has cost a professional man two years of unremitting attention and experiment, even hope that he will be likely to publish the details. In a letter he informs us that the principles of the discovery have been known to him for two years, but until recently the difficulties had not been sufficiently overcome to enable him to place a perfect production before the public. The process is now, however, sufficiently perfect, we understand, to offer plates of unequalled sensitiveness and keeping properties, and yielding negatives in no respect inferior to wet collodion. And, as we observe from the list of prices, these prepared plates are offered at prices only a trifle more than double the price of patent plate glasses, photographers will have the less to regret the secrecy of the process; excepting always those cases, and we believe amongst amateurs they are numerous, where photography is pursued as much for its own sake as for its results—the excitement of the chase, and not the value of the game run down, constituting the inducement.

Positives on glass, as well as negatives, may, we understand, be produced on these plates, protosulphate of iron, acidified with nitric acid, being recommended by Dr. Norris in such case for development. For negatives pyrogallic acid and acetic acid is recommended, except for instantaneous views, combining clouds and water, where the distinctions are slight, in which case the doctor recommends iron.

The unfavourable weather and pressure of engagements have prevented us from making, as yet, a fair trial of these plates. We have, however, exposed two, in both of which, notwithstanding that we exposed about the same time, possibly a trifle longer than for wet collodion, the results showed considerable over-exposure. One was a positive portrait developed with a fifteen-grain solution of iron, containing two minims of nitric acid, the exposure was about forty seconds in a room with a small ordinary window, light moderate, a portrait lens rather slow in action: in our glass-room we should have given about one-third of the exposure with the same light. The development was very rapid, and, as we have said, the result showed considerable over-exposure. The other plate was exposed about one minute under the same circumstances, and developed, not according to formula, as it should have been, but with a two grain solution of pyrogallic acid, containing one grain of citric acid. This plate was also over-exposed, developing with moderate rapidity. We stopped it at a point which gave a good negative, but had we proceeded with the development, it would manifestly have gone on accumulating in blackness to a degree that would have rendered printing next to impossible.

Both plates developed with the most perfect cleanness, free from stains, blisters, or marbling of any kind. We hope shortly to make a more comprehensive and comparative trial, which we shall state in detail.

ON THE MECHANICAL ADAPTATION OF PORTRAIT LENSES FOR VIEW PURPOSES.

By C. Jabez Hughes.*

It is a well-known fact that the front lens of a double aeromatic portrait combination is of the same general form as a single landscape lens. It should be remembered, however, that in taking portraits the convex surface is turned outwards towards the object, but for views it is turned inwards towards the camera. The size and position of the diaphragms being also different in the two cases, it is clear that the mounting of the lens must vary according to the purpose for which it is to be used. I do not propose here to discuss how far it is advisable so to employ lenses, it is sufficient that they can be and are so used, and that different makers have exercised great ingenuity in adapting their brasswork for the purpose. To these various devices I propose to invite your attention, and I think we shall have occasion in passing them under review, to express our admiration of these adaptations. Almost every maker has his own method, and so important have some thought it that they have patented their plans. Let us take first one of the earliest and best makers, Voigtlander, and see how he accomplishes the task. He first separates his tube from the flange; into this flange he screws an *adapter*, that is, a brass ring with a smaller aperture: the front portrait lens is then removed and screwed from the back into this adapter; a brass cell with small diaphragm in front is then pushed on to the lens and it is ready for use.

[Mr. H. then changed various parts of a Voigtlander lens, as described, and handed it round to the members.]

This was, I believe, the first arrangement made for the purpose, but subsequent makers have very much improved in their appliances, as we shall presently see.

Ross adopts a more simple plan. He removes the hood from the front, unscrews the back lens, and reversing the cell containing the front lens, puts it in the place of the back lens; a series of diaphragms are then fitted in and it becomes a complete single view lens. The rack-work is made thus equally serviceable for landscape and portraits, and the body of the tube serves for a hood or shade. This plan is very simple and efficient, the cell with diaphragms being the only additions to the portrait combination.

[Mr. H. handed round one of Ross's No. 2 lenses fitted as described.]

Horne and Thornthwaite have a different method. They take out the front portrait lens, and, reversing it, screw it into a regular single lens brasswork, and, except with the flange, make no attempt to use the portrait lens brasswork.

[One of Messrs. H. and T.'s lenses were handed round, in illustration.]

Lerebour, I believe, has two different arrangements for this same object. Neither of his plans, I am assured, are remarkable for ingenuity. I am sorry I have not been able to secure one to shew you. Lenses, with this adaptation by this maker, are not common.

The late C. Shepherd adopted a very neat arrangement. It is still manufactured by the firm bearing his name, and to whom I am indebted for the experiment exhibited. It is somewhat in the rough, being got up at short notice for this meeting, but you will perceive the principle is still the same, using the front portrait lens reversed, and placing diaphragms in front.

The introduction of central diaphragms has enabled many opticians to combine appliances to serve purposes. For example, here is Millet's arrangement:—at the back of his front-portrait lens he attaches a tube, and at the end of this tube is the central diaphragms. When this front lens is removed, and reversed for landscape work, the same tube is in its proper position, and furnished with stops.

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* Read before the Meeting of the South London Photographic Society, held on the evening of Thursday, October 18th, 1860.

This, as you perceive, is also a very neat arrangement, and highly ingenious.

Hermagis, in his patented method, has made a very daring innovation. He cuts his tube in two parts, right through the rack, midway between the lenses. One of these screw into the other, and the stops are introduced at the intersection. When required for single lens purposes, the two halves are separated, the back one removed from the flange, and the front half screwed in its place by means of a thread left on the hood; the diaphragms are then in their proper place, and, by an ingenious arrangement, that which formed the cap of the portrait lens becomes the hood and cap also of the single lens.

[This arrangement excited attention by its originality and ingenuity.]

Most of you will remember a peculiar and cumbrous mode of mounting his lenses that was patented by Jamin; the back lens being larger than the front, and having what he called a "centralising cone." In this arrangement the tube was in halves, one screwed on from the outside of the camera and the other from the inside. But though clumsy and inconvenient it was the foundation of his present method, and which is certainly the most elegant and ingenious that has come under my notice. In this lens we have for the first time three lenses instead of two. Midway between the front and back lenses is an arrangement for central diaphragms, or for this third lens. This latter may be used or not in connection with the portrait lenses, but its main service is in connection with the front lens used as a landscape lens. It shortens the focus so that a sharp flat picture can be obtained in the usual camera, whereas the ordinary single lens requires an unusually long camera to be employed. The arrangements for changing the parts are very simple. By means of an extra tube the front and back lenses are instantly attached or detached. It is difficult in words exactly to describe, but you see the instrument in my hands and the case with which the several parts are transposed.

[Mr. H. here described minutely the different appliances of Jamin's Patent Treble Portrait Combination, which excited great admiration.]

The next lens I introduce is Derogy's. In this arrangement more is attempted than any other. The lenses consist of the usual portrait combination and two additional ones, one for lengthening, the other for shortening the focus. First we start with the usual portrait combination as it is now. To make a smaller or larger picture we separate the lenses, which is very easily done by these bayonet joints, and insert the long or short focus supplemental lens. To use it for single-lens purposes we separate them thus (disconnecting them), and remove the back lens, and in its place put the front lens reversed; to increase or decrease the size of the picture one or other of the supplemental lenses is to be used in addition. The whole arrangements are very simple, but whether more is attempted than can readily be reduced to practice, I will not express an opinion.

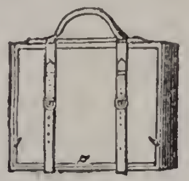
The last lens I shall introduce is Mr. Slater's with his Petzval Combination. It consists of the usual portrait combination with a negative focus lens used between. It makes an excellent instrument for groups when the central lens is used, as it gives more generally distributed definition than any other lens I know, and is the only lens I have used that gives the head, feet, and centre of the body sharp at the the same time of a figure standing. This peculiarity is entirely due to the central lens. To use it for landscapes it is only necessary to remove the back lens. It is provided with Waterhouse stops that are equally suitable for landscapes or portraits.

I have now introduced to your notice the greater number if not all of the modifications adopted to use the front lens of a portrait combination for views, and though I should like on a future occasion to listen to a discussion on the fitness of the said lens for the proposed object, yet I think at present enough is before us to express opinion on the many ingenious plans to render yet more useful our already invaluable portrait combinations.

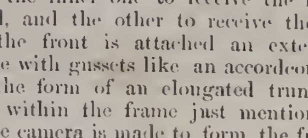
MEAGHER'S IMPROVED PORTABLE CAMERA.*

This camera was, so far as the general design is concerned, I believe, invented originally by Mr. Kinnear; but the design in the one I am about to describe has undergone many modifications and improvements in detail. The chief claim I possess to bring it before the attention of this meeting, is the fact that some of the improvements were suggested by myself to the maker. In stating this I do not claim any originality in the idea of these improvements, but merely their application in the present instance.

The points on which this camera claims the attention of photographers are portability, lightness, and efficiency, each of which I think it possesses in a maximum degree. The outside measurement of a camera for ten by eight plates, is twelve and a half inches by ten and a half inches, and three inches deep; its weight does not exceed seven pounds, and being supplied with a handle, it is very portable. Its form when packed up is here shown:—



On opening the camera it is found to consist of a frame of Spanish mahogany or teak, three inches deep, having two grooves, the inner one to receive the focussing screen when packed, and the other to receive the dark slide or back. To the front is attached an extending body of leather, made with gussets like an accordeon or concertina, but having the form of an elongated truncated pyramid, which packs within the frame just mentioned. The base-board of the camera is made to form the front of the box when packed up. Within the base-board is a light but firm sliding-frame, by the extension of which, the bellows are drawn out to their full extent. This extension is effected by means of a fine slow screw, which is worked at the back, thus affording facilities for the finest adjustment of focus from the back of the camera. Attached to the front of the sliding-frame, to which I have just referred, is another hinged frame, which on being raised is found to possess grooves in which the part carrying the lens, attached to the bellows, is fitted, and being fixed by means of screws at any height possesses all the advantages of a sliding front. This small hinged frame is supported in position by oblique brass stays which are attached to the base-board, and, working on a centre, are laid flat, when the camera is packed up. The frame constituting the body of the camera is attached to the base-board, either in a horizontal or vertical position, as the view to be taken may require, by means of two brass screws underneath. The form of the camera when erected for use is seen thus:—



I am now come to describe two or three important adjustments which the camera possesses, and which give it all the advantages of a double action swing back, both as regards lateral and vertical motion, without either the cumbersomeness or costliness usually pertaining to that adjunct. In the base-board, at the point at which the two brass screws attach it to the body of the camera, are two curved slots, through either of which the screws attached to the body—which works on a brass pin in the centre—move for a given space, allowing the back, although fixed in the centre, to traverse the arc of a circle, thus gaining all the advantages of the swing back in that direction. The vertical movement is gained by a slight deflection of the lens, the frame which supports it working on its hinges, and is fixed in any required position by a screw which passes through a slot in the brass stays. I am aware that the use of this movement requires great care and some knowledge and experience, as by moving the lever at the short end, a very slight inclination will cause a considerable deviation of the axis of the lens from its normal or true position. In the ordinary swing back the method of adjustment to give definition to objects in an advanced plane of the lower part of the foreground in a landscape, or of the figure in portraiture, it is customary to incline the top of the slide a little backwards, so as to adjust the distance between the objects in the foreground, and that part of the plate on which they are delineated: here it will be necessary that the camera itself shall be turned on its axis, or, in other words, that it be tilted, so as to give the back the requisite slope or inclination. In doing this, however, if the lens were rigidly fixed, it would no longer embrace the view to which it was originally pointed, probably little more than the tops of the trees and the sky being delineated. To remedy this, the facility of changing the position of the lens becomes of the utmost service, for, when the camera is thus tilted, a slight depression of the lens at once makes it include the desired view, and at the same time secures the direction of the axial pencils on the centre of the plane of delineation, whether it be the focussing screen or sensitive plate. Another point secured by this movement, which, to the artistic photographer, will be an important one, is the facility of slightly altering the direction of the axial pencils, and thus securing the best definition of an important part of the subject, irrespective of its occupying a central position, at the expense of some other part in which definition is of little importance. Thus, in a landscape, the foreground objects may often require, in order to produce the most artistic result, the best possible definition, which will be secured by directing the axis of the lens towards that part of the field, whilst the part which would suffer from this deviation of the axis of the lens, would be the sky, in which definition is of little importance. I may mention here that Mr. Shadbolt, some time ago, devised a very ingenious method of effecting the very purpose secured in this camera by these simple movements. His plan was to attach the lens to a piece of wood constituting a section of a globe, which, being secured in the aperture in front of the camera, possessed a ball and socket movement, allowing the lens to be turned in any direction. The especial object of this invention was an easy application, to ordinary rigid cameras, of this movement, which is here obtained, however, by a much simpler method. As I before remarked, it will be necessary, in making use of this adjustment, to use caution, remembering that in proportion to the length of the lever, formed by the body of the camera, a slight movement at the lens, will cause a very considerable deviation in the direction of its axis towards the plate.

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* Read by Mr. G. Wharton Simpson at the Meeting of the South London Photographic Society on the evening of Thursday, October 18th.

It only remains to be said that single backs for wet plates, or double backs for dry plates, can be fitted to this camera without increasing its bulk; and to add that the material, mechanism, finish, and general workmanship, appear to be of first-class character throughout, thus securing the efficiency to which I first referred, as well as the portability and lightness which are so apparent as to need no further comment.

FROM A PHOTOGRAPHER'S COMMON-PLACE BOOK.*

Turning to the numerous other old churches we find interesting relics or memories clinging ivy-like to them all. St. Dunstan's Church of the Holy Cross, with its curious semicircular tower, is remarkable as containing the skull of Sir Thomas More, deposited here after his execution, "with great devotion" by his loving daughter, Margaret Roper, whose husband wrote so pleasingly and well of this great and honest-hearted chancellor's life and character. I think you will expose a plate at old St. Mildred's Church, with its leaning gables and avenue of lime trees.

In more or less quantities relics of architectural antiquities are scattered so closely around that I shall not attempt even to name them. The massive remains of St. Augustine's Monastery, already alluded to, speaking so emphatically of past-away grandeur and piety, will provide you a little camera work. Picturesque remains of the Black Friars Convent are still observable, and also the ruins of St. Sepulchre's; this last-named being interesting as the nunnery from which "the holy maid of Kent" published her prophetic dreams, until an execution for treason was the only means of making her slumbers dreamless, and King Henry the Eighth's sounder. St. John's Hospital will, with very many other ruins, plead for a visit; but, let me pause, for I shall surely enter into competition with the guide books and their vendors if I add more. So let us then come at once to the cathedral, a few words on which will conclude the last extract I shall make from this portion of my Common-place Book.

A feeling of awe will creep over you if you near, in contemplative mood, this mighty relic of so many ages, and look thoughtfully upon the glorious old gothic pile as it stands calm and majestic in its sober robe of grey masonry; singularly harmonious in effect, as a whole, despite its varying styles of architecture, and strange mingling of the massive and the delicate, the simple and the elaborate, in its ponderous dimensions and parts. Uninfluenced by the many weather stains, it stands before us with that quiet breadth of colouring which gives so much more force to its solemn grandeur and picturesque beauty.

A painter of genius who sought to pourtray this mighty fabric, would not know content until this sense of awe and veneration entered his mind, as readily when contemplating his picture as when looking upon the cathedral; he would carefully study every circumstance and accident which might so affect his mind; such as the general tone of his picture, the strength of the lights, the depth of his shadows, the grouping of masses in the chiaroscuro, &c. In short, he would almost instinctively set about analysing his feelings, that knowing their source, he might draw therefrom the power of making others feel as he felt. Just so, it should be, with the photographer.

To describe but a small number of the excellent views procurable within, without, and about Canterbury Cathedral, susceptible as they are of the most poetical treatment, and full as they are of pictorial excellence, would probably render me tedious and wearisome. So here I turn the page, for—as doubtless you have seen—my intention has not been so much to steal a few pages from our department, headed "Photographic Tourist," as to introduce in a pleasant readable way various subjects calculated to instruct, interest, and amuse my photographic fellow-students; but my chief object in this rambling chronicle of rambles has been to give force and practical value to a few of the rules and principles of the painter's art.

So the pages of my Common-place Book go flying over, until it once more lies open at a place where I have jotted down a few brief remarks, which may now be extracted under the title of—

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* Continued from p. 280.

PHOTOGRAPHIC EXHIBITIONS AND ART PROGRESS

Merit is a blossom that loves the light, and soon loses the vigour of its youthful health when shut up in close and confined habitations, and nothing will so effectually shame idle mediocrity, as a wide-spread knowledge of its manifold shortcomings; therefore let us rejoice that we have Photographic Exhibitions. These periodical gatherings of our best production cannot be too highly valued, and their recent steady increase in both number and merit are truly and simply evidence in favour of their own great influence on public taste, and artistic progress.

If any proof were wanting that photography owes its popularity more to its character as an art than its position as a science, these Exhibitions should supply it, inasmuch as it cannot be supposed that a mere collection of philosophical experiments thus embodied, but entirely divested of pictorial qualities would create the same amount of public interest.

If we glance back at the art history of England, we shall find that as picture exhibitions grew in number and increased in consequence, artists and their patrons advanced in their judgment and grew in number also; until the present time, when our country was never so prolific in art producers, art patrons, and art exhibitions; and yet only in 1768, this metropolis possessed but one scarcely-noticed annual exhibition of pictures, that of the "Incorporated Society of Artists," and in which a production at all above mediocrity, was, from its rarity, like an angel's visit.

A little thought, then, will suffice to show that in creating competition and raising the standard of public taste by organizing its present exhibition, the Photographic Society of London did more for the advancement of the art and the welfare of its professors, than has been effected by all the subsequent papers and discussions brought forward at its monthly meetings. It is a pity that this fact does not appear to have due weight with its council, and bring about, not only a more active appreciation of the artistic, but a greater interest in, and effort for, its cultivation. So far as its labours in this direction have at present gone, instead of a society for the advancement of photography, so widely known, practised and recognized as *an art*, it might have been a society of photographic chemists and opticians established for the benefit of these branches alone. There is a new phase of existence full of increased utility, greater prosperity, and loftier purposes, awaiting this society when it has learnt to recognize photography as an Art, based upon scientific discovery, and act upon that conviction in the spirit of kindred associations, as surely as there is an early and tedious old age of dull uninteresting empty talk about immature embryos awaiting it but a little way on if it pursue its present career unaltered.

It is perfectly true that the scientific elements of photography still offer a very wide field indeed for philosophic research, but the laboratory of the chemist and the experiments of the optician, are not so continually sending forth new facts as to supply all our hungry societies with fresh food at every meal. Already the dearth is felt, old clothes are furbished up to look like new, and the well-scraped bones of yesterday deck the tables of to-day. All honour to the Photographic Society of London, for it was the first and is the parent of a thriving family that still labour successfully in our behalf—not a stone against it would I cast—but pardon me if I cannot help pointing out by way of warning, how it is only doing the half of its great work, and has time and means in plenty to spare for the remainder. That we owe it much is no reason on earth why we should not owe it more. Before I can thoroughly value the one half of a bank-note, I must have received its fac-simile.

One of the consequences of the progressive growth and advancement of our art exhibitions, is the creation of a new class of critics—critics who write, and the influence exercised by their criticisms is one of the most powerful agencies for or against progress. But the race of true photographic critics is unborn; and in their place we have critical chemists, critical opticians, and critical mechanics, discoursing learnedly about baths, processes and tones, sharpness, clearness, and distortion, spots, stains, markings, exposure and other manipulatory details, but utterly ignoring the existence of artistic ability, and the higher qualities of pictorial beauty, sacrificing intellectual worth to the minor details of experimental science or the petty little tricks of successful mechanism.

As the character of our photographic exhibitions rise into the realms of taste and refinement, this will no longer be the case; the best critics of our art galleries will be also the critics of our photographic collections, and, with the partial criticisms above referred to, will, it is hoped, pass away the impertinent censures of dogmatic ignorance, with which, in reference to art, they have so very frequently been associated. That this may be hoped we glean from the fact that, up to the latter end of the last century, art itself had no critics in our public journals. Refer back to the early volumes of the *Gentleman's, London, and Westminster Magazines*, or the *Annual Register*, and other old newspapers, and you will scarcely find a paragraph containing one reference to an English artist's name or works; although now scarcely a paper is published, of whatever quality or character, that does not teem with strictures on arts and artists.

While copying the above remarks I have sundry reasons for doing so, to which I may as well refer.

The next exhibition of the Photographic Society is drawing near, and it is time that those who intend exhibiting at the same should think about the preparation of their specimens. It is well also that our exhibitors should know how much may be dependent upon their efforts, and what influence their productions will exercise in supporting or improving the character of their art. It is just as well too for somebody to give the parent society, as it is called, a hint as to the importance of judiciously choosing works for exhibition, and, therefore, of selecting competent members of their body, to serve as the "hanging committee." Somebody will think I've a good store of impertinence to talk to my betters in this way, but a small pin, with the poorest little head in the world, will wake up a sleeping giant if stuck in the right place; and, if I play such a part, who shall quarrel with me? In conclusion, let me cry to our Williamses, Rejlanders, Fentons, Silvys, Bedfords, and Lyndon Smiths, come forward this next year in such numbers and strength as may thrust from the walls all productions which are not their worthy peers, for the honour of the profession, the welfare of its professors, and the glory of photography!

A. H. W.

SCIENTIFIC GOSSIP.

We have been much pleased lately with the perusal of a book on the chemistry of dyeing and bleaching,* by one of the principal scientific men in this branch of manufacture. The chemical action of light and dyeing have so much relationship to each other that a work devoted to the latter subject cannot fail to contain much that will be of interest to those who are more particularly engaged in the study of the former branch of science. Practical dyers insist that the finest colours can only be produced in good clear weather; the most beautiful dyed silks and velvets of France are produced by small dyers who perform the final operations in clear bright weather and out of doors, turning the goods over and over in the dye, lifting them out to meet the sun's rays, and, regardless of prescribed times and quantities of material, handling them till they find them finished. In our own dye-works it is also supposed that a bright light is of importance in dyeing colours of the finest quality. It is thought that if all other things be equal the brightness or dulness of the daylight influences the product of the dyeing. It is well known that plants which grow in dark places are pale coloured, and that the most sunny climates produce the brightest colours in the vegetable and animal kingdom. On these accounts it is necessary for a practical dyer to be well acquainted with the chemical action of the sun's rays, and it is likewise impossible for any one of an observant turn of mind to pass much of his time in the practice of dyeing without having noticed many facts of great interest to the photographer. In nearly all colouring matters used in the arts the colour is fully developed before the dyer uses it, and it is interesting to consider in how many cases without the access of light; the heart of logwood cannot be supposed to have been influenced directly by the rays of light; we know that the colour of indigo is only developed after the death of the plant, and in madder root the colouring matter must have been formed in perfect darkness; but whatever doubts may be entertained as to the universality of the power of light to produce colour, we can have no doubt as to its destructive action upon colouring matters under almost any circumstances when prolonged beyond a short time. In most cases of rapidly fading colours, such as saf-flower pink upon cotton, and archil and cudbear shades upon silk, it is the light and not the air which destroys them, or at least the light is the most rapidly destructive of the two; the direct rays of the sun being the most concentrated form of light are the most active, but a bright diffused light is very energetic. A saf-flower pink on muslin may become nearly white in three or four hours sunshine, and a peach-coloured silk ribbon dyed with archil is destroyed in about the same length of time. That it is the light is demonstrated by the preservation of the colour in the folds or protected parts of knots and bows formed by the material; the air could have access to these almost as readily as to the exterior portions, but they are nearly uninjured. Light is an imponderable body, and as such leaves no marks behind it detectable by the balance. It is not clear whether these transformations are simply a change in the chemical or molecular structure of the colouring matter, or whether the light induces an oxidation or deoxidation of the colouring principles. The first view seems the most probable from the knowledge we have of the action of light upon chemical substances, though the second is not without probability. The action of light upon substances in general may be profitably studied by the student, as it is very probable that some means of protecting these easily alterable colours may be devised from a knowledge of the laws and properties of light. There are many cases known in photography in which an addition of some other substance renders the sensitive material insensitive to the action of light; and it is possible that the very delicate and fugitive vegetable colours may by some practical process be similarly desensitized. This is no doubt a very difficult line of research, but one in which there is both hope of success and rich reward. Several interesting notes on the chemical action of light and its effect upon dye colours are to be met with in this work. The following account of some experiments undertaken with a view to introduce photographic printing into the dyer's domain will be read with great interest, and we hope will induce others to whom the minutiæ of photography are more familiar, to turn their attention to this interesting and commercially important subject. Speaking of the effects of light upon the ordinary photographic materials, our author goes on to observe:—"Photography has not yet any application in calico printing, but it may be interesting to know that it is possible to print pictures by photography and dye them up in madder and other dye-woods. I have done this several times and in several ways with iron salts. Calico may be prepared with the ammonio citrate of iron, dried in the shade, and then covered with the object or picture, and exposed to the rays of the sun in a photographer's copying press; the iron is partially fixed upon those parts exposed to light, the calico may be then passed in yellow prussiate which forms Prussian blue with the iron fixed; this can be decomposed by dilute caustic alkali, leaving the oxide of iron, which by boiling in cow-dung, becomes fit for taking up dyes, and with madder gives a lilac or purple. The bichromate of potash is decomposed by light in contact with calico; washing in water removes the unchanged bichromate, the remainder may be fixed by dilute alkali, and forms a weak mordant for several dyewoods. Indigo blues padded in bichromate of potash for discharging with acid, must be kept from strong direct light on account of its decomposing action on the bichromate."

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* "The Chemistry of Calico-printing, Dyeing and Bleaching," by C O'Neill. Manchester: Dunnell, Palmer, and Co. London: Trübner.

The above experiments are very interesting, as they point out an entirely new line for the investigative energy of some of our young experimentalists to disport itself in. One of the materials used—cow-dung—will doubtless be hailed with delight by those who are ever on the look out for a new organic substance wherewith to smear the surface of a collodion plate. If at some future time, when the "cow-dung process" is all the rage, and papers are written in England, and patents taken out in America, respecting this interesting preservative agent, we hope it will not be forgotten amongst the crowd of rival claimants which will be sure to arise for its first suggestion, that we ourselves have some slight claim for that distinguished honour.

An important series of experiments connected with electric telegraphy have recently been communicated by Dr. Mathiessen to the Royal Society. He has been induced to investigate the influence which an admixture of foreign bodies has upon the electric conducting power of pure copper, by reason of the great discrepancies which different samples of copper-wire presented, when tested for electric telegraphic purposes as to their power of conducting the electric current; some specimens of apparently equal purity having less than half the conducting value of others. In the outset of his experiments the doctor found that one great source of the discrepancies hitherto noticed has been the presence of oxygen, which it is well known to smelters copper absorbs with avidity. This element when present in very small quantity only in the copper-wire reduced its conducting power from about 93 to about 70. The effect of carbon, sulphur, phosphorus, selenium, tellurium, and arsenic were likewise tried, and in each instance the presence of the metalloid was found to have a strongly marked prejudicial effect on the conducting power, in some cases (with phosphorus and arsenic) sinking down from 93 to between 6 and 7. The effects of different pure metals such as zinc, iron, tin, silver, gold, and lead, were next tried, but with one uniform result, namely, that of deteriorating the conductibility, and Dr. Mathiessen has hence been led to this important conclusion, that "there is no alloy of copper which conducts electricity better than pure copper."

DRY COLLODION.

BY A. GAUDIN.

At the present day stereography has become the most important branch of photography. Notwithstanding the limited dimensions of the proofs, I am persuaded that the fabrication of stereographs, both positives and negatives causes the greatest consumption of photographic materials, and gives rise to a most important manufacturing business.

To obtain negatives, instead of albumened plates, we use collodion; but there arises this embarrassment, we must be, near the operating room to sensitize the plates, and develope the pictures, without reckoning that the degree of dryness of the air influences the results materially.

It will therefore, be of the first importance, for the success of stereography, to be able to operate upon dry collodion as we operate upon albumen; and M. Vernier's communications came very *apropos* to agitate this subject; unfortunately he promises to acquaint us with the causes of our want of success; but I can discover only a very witty style of criticising what has been proposed or achieved, without his ever touching the root of the question, except to speak of the glutinous nature of collodion, and to say that he is able to modify it by certain additions, which he does not name, as he has only very vague ideas himself on the matter.

I will now reiterate the facts.

In what does albumen differ from collodion? It differs from it in one essential point, it is soluble in water, while collodion is insoluble. Albumen is easily rendered insoluble during the manipulations; but originally it was soluble; so that in iodizing it, the iodide becomes intimately mixed with the albumen; and when it is passed into the silver bath the iodide is produced throughout the entire substance of the film. At this moment the albumen is rendered insoluble: but the film is already converted into a spongy body of infinite delicacy, susceptible of absorbing and swelling in aqueous compounds; it is only necessary to see white of egg coagulated, either by heat, or by acids, to be assured, from its opaline tint, that it is a spongy body.

Collodion, on the contrary, is a *fatty* body; that is to say, soluble in a mixture of ether and alcohol, which water precipitates, which shuns the water as much as possible, incorporates itself with fatty bodies, and adheres strongly. On this account when collodion is poured on a plate it divides itself in proportion as its solvent evaporates: the collodion condenses apart, and the iodide added to it rises above in the form of a layer, and when contact with the silver bath ensues, it forms on the *surface of the collodion* and *not in the interior*, a continuous pellicle of iodide of silver.

This may very easily be seen when we make use of weak silver baths, the iodide of silver detaches itself, and a film of *limpid* collodion remains on the plate.

Therefore coagulated albumen is permeable to aqueous liquids, while collodion is impermeable to them.

I will now give another convincing proof of this;—

For a long time I had the notion of employing a very sensitive collodion: that is, one containing iodide of silver. At first I experienced much difficulty in producing iodide of silver in the collodion without coagulating the latter; nevertheless, I ultimately succeeded, so that after pouring my collodion on the plate it had the appearance of a film of sensitized collodion; it had its bluish tint, and I thought I had only to expose and develop it with a developing solution containing nitrate of silver; but the silvered developing solution produced not the slightest effect, however long the action of the light might be prolonged; therefore, the collodion in a fresh state, is *impermeable to aqueous liquids*, its ordinary iodide is altogether superficial, while the albumen in every state is *permeable to aqueous liquids*, and the iodide of silver is as much in its substance as on its surface.

Every preparation containing free nitrate of silver undergoes reactions in the course of time, even out of the influence of light, they cannot, therefore, be preserved for a long time without deteriorating. To preserve dry collodion as we preserve albumen, it must be submitted to a washing, like albumen; and if, in this respect we treat collodion only with as much care as we do albumen, we shall attain the same success, with this difference, that the sensitive film being wholly superficial and unprotected, it is much more sensitive to the influence of time.

After perfect washing I am induced to believe that collodion will keep still better than albumen; for at the moment of excitation the nitrate of silver is introduced into the very heart of the albumen; while in collodion it moistens only the two surfaces of the film; I say the two surfaces because it is certain that the nitrate of silver during the immersion instantly reaches even the surface of the glass; this is remarked very readily whenever an ill-prepared plate contains organic matter on some portion of its surface; it appears without need of silver reduced during sensitizing.

Accordingly, we must not only remove the excess of nitrate of silver from the surface, but also that on the side next to the glass. In albumen, the latter is in much less quantity, for in its progress it encounters through its whole thickness the iodide, which decomposes it.

In conclusion, I must again repeat, wash the collodion with the greatest care, pass it into salt water; wash again, and finish with distilled water, and then you may proceed with as much confidence as with albumen.

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 18th October, 1860.

Leon Halevy has rendered an elegant tribute to photography in his charming historic *éloge* on the most eminent among French engravers, the late Baron Boucher Desnoyers.—He writes—"Engraving was twice menaced during the long career of Desnoyers; first by lithography, next by photography. Engravers may have suffered by the competition, but not the art of engraving.

"Lithography has made good progress, and we are glad to proclaim the service it has rendered Art by the legitimate success it has achieved in skilful hands. Yet the art of engraving proper has lost nothing in the conflict, but has fully maintained its position. Photography is a much more formidable rival. If a painter of antiquity, permitted to revisit the earth, were to witness the marvels of photography, he would exclaim—'Apollo! yes, truly thou art the god of the sun and of the arts; while driving thy chariot through the heavens, by a ray of prolific light, thou tracest images more true and perfect than the pictures of Apelles.'"

Photography has progressed, and still greater progress awaits it; it belongs both to science and to art; a useful and charming auxiliary, prompt reflex of the true and the beautiful, the universe is open to it. Nevertheless, the art of engraving will not perish, but for ever retain its peculiar power and excellence.

Some very splendid life-size direct positives, obtained by an entirely new method of enlargement, the productions of Mr. Wothly, an eminent photographer, resident at Aix-la-Chapelle, were recently exhibited at the Academy of Sciences. These portraits excited universal admiration, and I regret that the method by which they were obtained was not communicated; I hope, however, that it is not the operator's intention to preserve the secret of his success, which must assuredly excite the admiration, and perhaps also, the envy of all photographers who behold his productions.

It is the practice of manufacturers who employ animal charcoal in their processes of decoloration and decomposition, to *revive* it after use. This revivication consists in washing the black with diluted hydrochloric acid, but M. Gustave de Capol has discovered that this method of treatment is very injurious. The black is changed in its physical constitution in proportion as it is disintegrated by the acid, but what is still more important, its chemical composition becomes modified.

Newly made animal charcoal consists, according to Bussy, of—

Phosphate of lime	88
Carbonate of lime	?
Sulphate of lime	?
Oxide of iron	2
Carbon containing 6 to 7 per cent. of nitrogen	10.

Hydrochloric acid produces a disengagement of sulphuretted hydrogen; the sulphur in the black is replaced by chlorine. This substitution gives rise to various modifications in the properties of animal charcoal.

It results from the comparative experiments of M. de Capol, that animal charcoal, treated with hydrochloric acid has a superior decolouring power to all others, but it is infinitely less apt to remove the lime contained in sugar than animal charcoal that is simply washed with water. His conclusion is, therefore, that the use of hydrochloric acid must be greatly restricted, and that the quantity employed must never be sufficient to produce a disengagement of sulphuretted hydrogen.

Dr. Buisson relates the history of a blind lunatic who upon submitting to an operation for double cataract, recovered both his sight and his reason. Upon the moment of removing the instrument the patient cried out "I can see." These were the first rational words he had spoken for three years. The patient was fifty years of age. Six weeks after the operation was performed he was enabled to leave the hospital and resume his livelihood.

In a letter dated from Martinique, the writer, speaking of that terrible scourge, the *yellow fever*, remarks that he has recognised that the use of condiments, especially garlic, predispose persons to that malady, and the reason he gives for it is, that these aliments render the secretions more alkaline. Hence, he concludes that acids are good preventatives of yellow fever, and recommends lemon-juice, still he admits that their action cannot always be relied on. He relates that after dining off a dish in which garlic was very prominent, he had a violent attack of fever, and reached home with much difficulty. The physician administered lemon-juice as a drink, and in baths and compresses, from which he concluded he had taken yellow fever. This treatment was continued; but the disorder, first abating, resumed its virulence, and in the course of a few days the patient discovered with horror that his limbs were so cold, that the contact of a strange hand produced a sensation like that of a hot iron. Concluding that he would soon die, unless he made a vigorous effort to overcome the disorder, he obtained some Madeira wine, in which he dissolved some quinine, which he drank. At the same time he drank some old Bordeaux wine. By the evening of the first day he had drank twenty-two glasses of wine; next day the physician was astonished to discover that the disorder was completely overcome, and that the patient required only time and care to become convalescent.

The writer of this letter mentions also another mode of treating this horrible malady, which consists in administering small doses of tartar emetic. He states that this mode of treatment produced marvellous results on board the Corvette *l'Utile*, when fifty-two persons on board fell sick with the fever, while on board two other vessels in the harbour at the same time, in which a different mode of treatment was adopted, lost each about three hundred men in the space of fifteen days.

It has for a long time past been feared that the usual sources of quinine would become exhausted. In 1850 the the colonial minister of the government of Holland formed the project of introducing plantations of *cinchona* into the Island of Java, and of naturalizing that plant in every favourable spot in the Indian Archipelago as had already been done with the tea-plant. A root of *Cinchona calisaya* was obtained in Paris, and carried to the Zoological garden of Leyden, to be conveyed to Java, so soon as it became sufficiently vigorous. In 1854 it had attained the height of ten feet, and had furnished 72 cuttings. The Dutch government also sent a special botanist to Brazil to collect seeds and plants, and also to study the nature of the soil and climate where the cinchona flourished in its wild state. He returned with specimens of several varieties, which have been multiplied. In 1855 the number of thriving plants in Java amounted to 2,100. The oldest trees had already borne flowers and seeds, and plantations were formed wherever the locality was considered suitable. The result of these efforts was, that in 1859 the number of young trees amounted to 47,327. Of this number 7,867 formed actual forests, and may be considered capable of yielding a bark suited for medicinal purposes. Sulphate of quinine was prepared from Java bark for the first time in 1858.

It was scarcely to be expected that any new discovery remained to be made in descriptive anatomy, yet M. Lucquet has announced that he has discovered that direct, and comparatively large, communications exist between the venous and arterial systems, particularly around the large articulations.

Mechanics is one of the ruling powers of this century; we owe to it a very great part of the immense progress that civilization has realized during the past sixty years; but it shares the sceptre of the sciences with Chemistry. Now, these two great sciences, by which industry is governed, proceed by very different methods. Mechanics most frequently starts from principles in search of facts; Chemistry always goes from facts to principles; but notwithstanding its rapid progress towards a definite constitution, it still hesitates upon one of its fundamental principles, as was fully evidenced at the late Chemical Congress. But with the labours of Faraday, Gerhardt, Laurent, Liebig, and Berthelot, we may expect that Chemistry will soon rank among the positive sciences.

Astronomy is less in favour now-a-days than chemistry or mechanics; it has shed so much of its splendour upon past ages that we have accustomed ourselves to regard it as a perfect science, for which there remains nothing to be done but to perfect the details. Physical geography is now engrossing the minds of the ablest of scientific men, and meteorology promises to become a favourite study. The weather of the present year has abundantly proved that our present meteorological philosophy is at fault, and quite incompetent to the prediction or explanation of the weather.

Meteorology is a study of facts; it records the present, compares it with the past, but knows nothing whatever of the future.

M. Geoffroy Saint-Hiliare believes that the question of "fossil man" will soon be answered in the affirmative. He says, "We have now in science a good many facts which must be considered as conclusive, if we regard man as any other animal. Human bones have been found in such situations, and with such characteristics that we should not for a moment entertain a doubt of their being fossil bones if they belonged to an elephant or an ox. But as it was the question of *man*, and in opposition with a scientific notion, minds were tortured to find excuses for rejecting correct conclusions, and the most diverse theories, and sometimes the most contradictory, were imagined to explain how human remains came to be subsequently transported into caverns or pits of fossil-bones. If there were but one such fact, if the bones were but few in number, these hypothetical explanations might have been accepted, but when they occurred ten or twenty times, and as each new case required a special hypothesis, and entangled suppositions, ending in contradictions, they were obliged to be all given up, and the fact of the existence of *fossil man* admitted. Man has been contemporary with many extinct species, such as the *elephas primigenius*, the *rhinocerus tichorinus*, the *ox*, and *fossil horse*. Cuvier placed an immense *hiatus* between the extinct animals and the first appearance of man on the globe; but the tooth of the *elephas* has been found among weapons shaped by human hands, such as flint arrow-heads, &c., and also among human remains. Mr. Horner calculates that the specimens of pottery found in the deepest alluvium of the Nile are at least 15,000 years old. Now these alluvial lands belong to the present geological period, while the diluvium of the river Somme, which belongs to the preceding geological era, admits of our tracing the existence of man to a much remoter period.

The German chemist Fuchs, the inventor of *wasserglas*, or soluble glass, was also the inventor of silicatization, but Fuchs only applied it to the preservation of wood and ornaments; its application to the preservation of architectural works really dates only from the practical efforts of Leon Dalemagne.

Still the method of the latter, although giving satisfactory results, left much to desire, and he at length perfected it. When there is much rain after the silicatization, a portion of the silicate applied to the stone is washed off. M. Dalemagne has sought a remedy for this inconvenience, and he considers he has discovered it in the employment of a new product prepared by means of phosphate and silicate of potassa, which being applied to materials previously silicatized, completes the operation.

In causing chromic acid to act upon a solution of aniline in hydrochloric acid, and in varying the proportion of this latter acid we obtain a red, violet, or blue colour. A litre of aniline with a constant quantity of yellow chromate of potassa of about 80 grammes, gives the following results; when hydrochloric acid is added in proportion of half or three-fourths of a litre, the colour is red; with a litre of acid, it is violet; and with one and a half or two litres, it is blue. In afterwards neutralizing the product by lime until an alkaline reaction occurs, the blue coloration changes to green when kept from contact with air, and becomes blue again upon being exposed to it anew. Tincture of litmus exhibits the same characteristic.

Furfurol communicates a beautiful red colour to aniline. This reaction is employed to detect very minute quantities of furfurol. The colouring formed under these circumstances can be isolated; its hues are as vivid and pure as those of fuchsine, but the colour cannot be fixed, it disappears in a few hours even in the dark.

According to recent experiments, it is calculated that the velocity of electricity is 570,000 miles per second of time; but on the other hand it is affirmed that to measure the velocity of electricity is an impossibility. There is a period of electrical fluctuations, during which the intensity of the current gradually increases at one extremity of the circuit, then diminishes at the other extremity, and which attains its extreme limit when the current, having arrived at its maximum of power, has the same intensity at every point of the circuit it traverses. This time depends on several circumstances, but especially on the length of this circuit, and instead of being proportioned to the simple length of the circuit, as we have been led to believe, is proportional to the square of its length. Finally, the force of the current implied by the instruments depending upon the moment of the variable period at which the experiment is made, and on the sensibility of the apparatus. We can understand why physicists who have only measured different periods of this variable period, are at discord, and have assigned different velocities to electricity.

Telegrams are sent at the rate of 12 to 24 words per minute. In every hundred words there are, upon an average, about 500 letters (492), or five to a word. In these hundred words the letter *e* occurs about 75 times; *s* 43 times; *n* 34; *a* 40; *t* 33; *i* 31; *u* 31; *r* 30; *l* 29; *d* 24; *o* 24; *c* 17; *p* 13; *m* 12 times.

The fleece of the sheep is impregnated with a quantity of grease which has to be washed out before the wool is available for the manufacturer, and is consequently lost. This grease is a complex substance, part of it is soluble in cold water, and contains 7 to 9 per cent. of potash; the other portion, more fatty, is insoluble in water. It is proposed to economise the water used in washing the fleece, as it forms a valuable manure.

Photographic Touring.

Sir,—I presume that the object of your Dartmoor Tourist was to obtain views in the moor itself, and to make Withecombe his real starting-point, otherwise his passing over what is generally considered the most charming scenery in the south of Devon without taking a view would be wholly inexcusable. Whatever his plans were, let me warn your readers not to follow in his footsteps, but to make Ashburton and Moreton-Hampstead their head-quarters if they would visit Dartmoor with the greatest amount of convenience and comfort. Conveyances and saddle-horses may easily be hired at these places, to proceed to any part of the moor the stranger may desire to see; and in both towns lodgings may be had, if a week's sojourn (which is always advisable) be determined on. The roads along and through the moor are better than I could have expected to find after reading the descriptions in the guide-books; and with an intelligent driver and a light dog-cart or other "trap," many most interesting excursions of from 10 to 15 miles distance can be made.

I write this from the town of Ashburton, where I have been ten days, partly weather-bound. I have, however, seen enough of this part of the country, and of the course of the river Dart from the moor to the ocean, to determine me to revisit both next summer with a stock of Dr. Hill Norris's new sensitive plates, my own being, I am sorry to say, now exhausted. Meanwhile, I have been noting down all the choice points for the finest views, combining pictorial and artistic effect; many of which, however, I fear, are too extensive for the limited capabilities of photography, unless Sutton's "Panoramic lens," could be made available. There are prospects to be had from some of the hills five or six miles from this place which on the whole appear to me as magnificent as any I have ever seen, and I am no stranger to the finest views in the highlands of Scotland, the lake districts of England, the mountains of Switzerland, the north of Italy, and the south of France. I can confidently promise artists and photographers a rich variety of fine views in this part of England, if they will give themselves the necessary time and trouble to find them out by climbing the hills and exploring the valleys. Few counties contain finer scenery than Devonshire, and the tourist who ascends the Tamar, the Dart, the Teign, the Exe, the Torridge, or the Taw, all in this county, will find himself amply repaid in the charming prospects they afford, while the sea coasts of both north and south Devon are full of interest and beauty. Let those who come to Ashburton not fail to mount Buckland Beacon, Rippon Tor, and the Haytor Rocks, from each of which they will obtain a splendid panoramic prospect, while the views from the lesser eminences, particularly in the valley of the Dart, will afford abundant occupation to the camera. Apologising for trespassing to this extent on your valuable space, I remain, Sir, your obedient servant, An Amateur.

Government Competition with Photographers.

Sir,—The letter of "J. H. L." in a former number deserves a word of notice, for its good nature and bad argument. "J. H. L." defends a system which he considers to have been designed to do the "greatest amount of good to the greatest number," though the effect of that system must be to check individual exertion, through which a community can alone prosper.

I assume that the initials "J. H. L." denote one who has adorned photography by his talent. Be it now the honourable task of "J. H. L." to defend the photographic profession in its hour of trial, and by so doing champion the right of all to exercise their calling whether in the museum, the gallery, the library or the warehouse, free from official tyranny.

I am satisfied that an examination of the evidence given before the committee will convince "J. H. L." of the extreme injustice of the "Report." It behoves all to resist this attempt to turn the Brompton Department into a trading establishment, in order that the "new channels" may be "opened for the employment of skill and capital;" and by the natural effect of competition cheap art circulate into the "homes" of our "poorer brethren." I remain, sir, yours faithfully, An Englishman.

Proceedings of Societies.

Manchester Photographic Society.

The Annual Meeting of this Society was held on Wednesday the 3rd instant, at the rooms of the Literary and Philosophical Society; Joseph Sidebotham presided. After some routine business, and the election of seven new members,

The Chairman said that the meeting would regret to learn that Mr. Mann, who had ably fulfilled the duties of honorary secretary for two years, was now compelled, from pressure of other duties, to resign that position. He was glad to add, however, that another gentleman, whose name—Mr. Mabley—he felt sure he had but to mention, to secure a unanimous election, had consented to undertake the duties. A vote of thanks having been passed by acclamation to Mr. Mann,

Mr. W. T. Mabley was then elected Honorary Secretary, and Mr. Edwin Offer, Treasurer.

The following gentlemen were elected on the Council for the present year:—

President—The Lord Bishop of Manchester.

Vice-Presidents—J. B. Dancer, Esq., F.R.A.S., J. P. Joule, Esq., LL.D., F.R.S., Arthur Neild, Esq., H. E. Roscoe, Esq., B.A., Joseph Sidebotham, Esq., W. C. Williamson, Esq., F.R.S.

Council—The President, the Vice-Presidents, Messrs. A. Brothers, J. Compton, Samuel Cottam, J. Dorrington, John H. Gilbert, George Higgins, William Hooper, Edward Mann, James Mudd, H. Petschler, A. Patterson, John Parry, J. J. Pyne, F. Tebler, H. Young, G. Wardley.

Honorary Secretary—Mr. W. T. Mabley,

Treasurer—Mr. Edwin Offer.

Mr. Mann then read the following Report of the Council for the past year:—

ANNUAL REPORT.

The Council of the Manchester Photographic Society, in presenting their Annual Report for the past year, have great pleasure in congratulating the members upon the very flourishing state of the Society.

The Treasurer's account shows a balance in hand of £50 17s. 3d.

There has been a considerable accession of members during the session, and the subscription having been now reduced (in consequence of the decrease in the expenditure) to 10s. 6d. with fee of 10s. 6d. for entrance, it is anticipated there will be a much larger increase during the next year.

The meetings have been generally well attended, and the experiment which has been tried of continuing the meetings throughout the year, instead of having a vacation as before, has been attended with complete success, and many very interesting meetings during the summer have been the result. Notwithstanding the extremely unfavourable photographic season, most of the members of the Society have made considerable and valuable additions to their stock of negatives, and numerous excellent specimens have been presented by them to the Society's portfolio, which has now become a very bulky and interesting record of the progress of the art.

The Photographic Exchange Club has, so far, progressed very favourably; and it is anticipated that the contributions will be ready for distribution among the members on or soon after this evening.

The following papers and subjects, among many others, have been read and brought before the meetings during the year:—

Mr. W. T. Mabley read a paper, written by George Shadbolt, Esq., expressly for this Society, *On the Focus of Lenses.*

Mr. Dancer contributed a Oxyhydrogen Lantern with the requisite apparatus, and exhibited numerous very beautiful transparencies upon the screen, they being entirely the productions of the members of this Society.

Mr. W. T. Mabley read a very interesting paper on the subject of *Photographic Printing on Paper*, which was illustrated by numerous specimens.

Dr. H. E. Roscoe read a paper, entitled, *Some Points concerning the Measurement of the Chemical Action of Light*, and which he illustrated by various diagrams and interesting experiments.

Mr. Mann, the Honorary Secretary of the Society, read a paper on some experiments made by Mr. H. Petschler and himself, communicating some new and important chemical facts with respect to the iodide and chloride of silver, and upon which Mr. H Petschler had founded a very valuable modification of the collodio-albumen process. This discovery has attracted a good deal of notice, and is perhaps one of the most important matters brought before the Society during the session. As some misapprehension has arisen in reference to the originality of this process, it has been thought desirable to explain, in this report, that which constitutes Mr. H. Petschler's discovery. It had been previously discovered that the application of a chloride to an excited plate did not destroy its sensitiveness, and in all cases the chloride was removed by washing; but this operation was not adopted for the purpose of restoring a dormant sensitiveness to the action of light, but simply to prevent a crystallization upon the surface. It was not known so far as published accounts show, that the plate was rendered sensitive by the washing. The discovery, therefore, is, that a film of iodide of silver is insensitive when in presence of a certain amount of an alkaline chloride or iodide but after a dormant manner only, and that it may be excited simply by washing. Since the last report many members have experimented largely in several of the dry processes, but the opinion is general that there is not one which can surpass or successfully compete with the Taupenot. The process (above alluded to) of Messrs. Petschler and Mann, affords much promise, but it is thought desirable that more experience should be gained of its capabilities before an opinion of its practical value is given. The subject of the dry processes, however, cannot be dismissed without mention of Dr. Hill Norris's latest improvement. Negatives have been shown in this room which were taken by an exposure fully as short as that required for wet collodion; and, although the results, so far as they have been made known to us, are wanting in tone and vigour, the step is so important and so suggestive of that which is most wanted, that it may be considered as the greatest event of the season.

Though the Society had very short notice of the kind offer made by the committee of the Salford Royal Museum and Library, to set apart a room expressly for the purpose of a Photographic Exhibition, a special committee was at once appointed, and a very excellent exhibition of the works of local photographers (with very few exceptions members of this Society) has been the result.

At the last meeting Mr. J. Parry read a paper on some very interesting and valuable experiments which he had made respecting the aceto-nitrate bath, as used for the collodio-albumen process.

The alkaline gold toning process has now come into universal favour, and it is a matter for great congratulation to notice the very superior and beautiful results produced by this the more correct method than the old ones, and which has the probabilities of permanency as well as superior whiteness and beauty of tone to recommend it.

The Council have great pleasure in calling the attention of the members to the fact that the British Association for the Advancement of Science have arranged to hold their meeting in Manchester during the next year, when it is hoped that some effort will be made by this Society to worthily represent the photographic art on that occasion.

In concluding this report the Council have great pleasure in tendering their best thanks, on behalf of the Society, to George Shadbolt, Esq., the editor of the *British Journal of Photography*, the Special organ of the Society, for the valuable assistance he has at all times rendered, and for the constant attention which he has always given to the general interests of the Society.

The accounts of the Society having been passed.

Mr. John Parry read a brief paper on a "Modification of the Collodio-albumen Process." He stated that he had in a former paper endeavoured to show that the only use of the bath of aceto-nitrate of silver in this process was the coagulation of the albumen. The best method of effecting this he found to be the application of hot water. He proceeded as follows:—Coat the plate in the usual manner with collodion; sensitize and wash, first in a large dish, and afterwards under a tap; allow it to drain a minute or two, and afterwards float over a solution of uniodized albumen, say one ounce of albumen to one ounce of water, and after draining a short time, but before it has time to set, immerse in a suitable vessel of very hot water, say for half a minute; dry the back of the plate with sponge and set in a dark place to dry, when the plate is ready for use. The conveniences of the above plan he finds to be cleanliness of development and entire freedom from blisters.

Mr. Dorrington remarked, in the course of the conversation which followed, that he had tried Mr. Parry's plan with success, and regarded it as very valuable.

After a vote of thanks to Mr. Parry, the proceedings terminated.

Photographic Notes and Queries.

Solubility of Iodides and Bromides.

Sir,—I shall esteem it a favour if you will tell me, through the News, the proper method of dissolving iodide of potassium, and bromide of cadmium, for making collodion. About a fortnight ago I powdered twenty grains of the former and fifteen grains of the latter, and put them in a bottle with half an ounce of alcohol, and they are not yet dissolved.

I have since put 5 grains of iodide into ¼ oz. of alcohol, and 4 grains of bromide into the same quantity, this time separate; the iodide dissolved fully in twelve hours, but the bromide was not diminished.—Yours, respectfully, J. C. B.

[Iodide of potassium is very sparingly soluble in alcohol, and bromide of potassium still less soluble; by putting the bromide of cadmium and the iodide of potassium into solution as you state, a portion of bromide of potassium has probably been formed. Alcohol 60 over proof will not dissolve much more than half the amount of iodide of potassium you placed in it. If you use the latter salt the proportion of bromide must be much less. With iodides of cadmium or ammonium you will have less difficulty.]

Bad-toned Glass Positives.

Dear Sir,—I am in possession of four of the best instruments that can be made, and have a first-rate operating room, and practise both *negative* and *positive* processes, but I cannot get a positive collodion that suits me; I have tried many different sorts, and cannot get good *blacks* or *whites;* as soon as the varnish is poured on it turns the picture of a *dirty* yellow colour, and if *exposed* unvarnished for a time, it fades; that is, with the kind I am working with now, viz. ——— and ——— mixed. If you can recommend me a *good* collodion (positive) I shall be glad.

Next—my bath, which is 80 oz., yields good pictures free from fogginess, but it is of a pale yellow colour; if you could tell me whether this is any detriment to the pictures I shall feel obliged; there is nothing in it but silver and distilled water—I have had a little *sal soda* and also nitric acid in to make it *work; can it be got bright and clear?* my *negative* bath is quite clear. Next—I would ask you what is the cause of the crystal varnish cracking and spoiling the negatives; I have some beautiful 12×10 negatives, and some of them are cracked all over, and they have not been taken more than three weeks—this is very annoying indeed: the varnish I use is French; and some I brought from London, for positive pictures never cracks, only the negatives. I placed a box full of ½-plate negatives away, and when I came to print half of them were cracked; the film is brought up from the plate in ridges. I shall feel greatly obliged if you will answer these four questions next News.

E. G. H.

[We suspect, from your description, that the chief fault is in your positive bath, which, from the colour you describe, probably contains organic matter, which is fatal to the tone of glass positives. Expose it to sun-light for a few hours, and if very old place it in an open vessel in a warm place to evaporate the ether and alcohol it contains—then filter, and strengthen with a little of a stronger solution of silver. We have had a bath of a deep greenish yellow giving brown positives, which by this treatment was restored to excellent working order—Add a small proportion of nitric acid to your positive developer. As regards the cracking of the film we can only conjecture the cause, which would seem to arise from the varnish being made with unsuitable gum, which contracts very much in drying.]

Cementing Indian-rubber Cloth.

Ashton-under-Lyne, Oct. 16, 1860.

Sir,—Having some Macintosh cloth, and being desirous of constructing a gas-bag, I should be exceedingly obliged if you could inform me how to do it.

My difficulty lies in the cementing the edges. I procured some indian-rubber cement, which I am informed is usually employed for the purpose rubbed it well into the margin of the cloth, an inch in width, and then applying the two cemented surfaces together, well rubbed them down, to cause perfect adhesion. After the lapse of ten days I proceeded to fill my bag, but it instantly gave way; and upon examination I found that the cement was still soft. Did I employ the right cement, or was my *method* at fault? Should the cement be allowed to *harden* a little before the surfaces are rubbed together? Is *rubbing* enough, or should great *pressure* be employed in addition? In short, what is the secret—how is the thing to be done?—Yours, &c. Oxy-calcium.

[Let the cement set a little before bringing the edges together; then, having done so, a few stitches would hold them in their place, taking care to rub the solution well into the stich holes when the rest is set. Perhaps some of our correspondents can give you further hints.—Ed.]

Hints to Colorists.

In pursuance of a plan already commenced under the head of "Hints to Operators," we intend to supply our readers from time to time with other such useful jottings as may be serviceable in any of the various branches of photographic art. The colorist will, therefore, not be neglected, as we trust this our first instalment of "Hints" will suffice to prove.

Chalk Background.—It is sometimes desirable to conceal the original photographic background, without bestowing any very great amount of time or trouble upon the process. When this is the case you can adopt no better, quicker, or less troublesome method than that of rubbing in a chalk background. This may be done in the following simple way:—Procure some soft Swiss crayons of the various tints and colours necessary for background effects, reduce them to powder carefully, and, with a leather stump, or the finger, rub the colours into the background, adding here a little warm colour, there a little cold, keeping this lighter or that darker, as the nature of your subject, and the due consideration of breadth and relief may demand, When near the outlines of the head or figure use a smaller stump with a finer point, *and more care.* A sky may be wrought in with excellent effect and no more labour, by first rubbing in the forms of light clouds melting into a blue, or blueish grey, as the case may demand, and then using a darker and somewhat warmer grey for the heavier masses. A few touches with pale orange and flesh colours near the horizon will produce a pleasing effect, and serve to repeat, artistically, the colours of the face. Where a surface of crayon, thicker than that so obtained, is thought desirable, a previously applied "wash" of body colour will be of great assistance. I should have stated that these chalk backgrounds are chiefly used on the plain salted, not the albumenized, paper.

Touching out Spots in Positives.—The tints for this purpose should always assimilate as nearly as possible to that of the photograph. Many use Indian ink only for the purpose, without the slightest reference to the tone of the picture and so render such defect as palpable as ever, if not more so. A few of the mixtures used for the purpose may assist some of our inexperienced friends:—

Indian ink and madder-brown. — Lake, lamp-black, and indigo.—Sepia, indigo, and lake.—Burnt siena, lake, indigo and sepia.—Vandyke brown and lake.

For albumenized proofs use a little gum with the colour. The pencil must not be too full of colour, and the method most successful is that of stippling with the point of a small sable pencil. As it is very difficult to conceal dark spots in the positive, the colorist should get the operator to touch out transparent spots or stains in the negative with opaque water-colour, in order that they may be white in the print. For this purpose he may use a little cadmium yellow, which is best applied after varnishing, as there is then no risk of injuring the film.

Tinting Photographs in Oil Colours.—A few years ago the majority of photographs coloured in oil presented a most uncouth and coarse effect, which gave rise to a common impression to the effect that oil painting was wholly unsuitable for application to photographs, as it appeared to destroy the chief characteristics by which they were distinguished, delicacy and truth. Water-colour painting, on the other hand, was regarded as pre-eminently fitted for alliance with photography, as in able hands the truth and delicacy were retained, and the charm of colour added. The efforts of skilful artists in oil have, however, during the last few years altered all that; they have shown that results at least equal in delicacy and truth, and far surpassing in permanency, are much more easily attainable in oil than in water. From some cause or other, whether imperfect fixation and bad washing, or whether from some chemical action of the suboxide of silver, of which the image is supposed to be formed, on the water colours, it is a rare thing to see a photograph, which has been coloured in water colours three or four years, in which much of the original beauty has not been lost: not simply the photograph itself presenting a faded aspect, but much of the original purity and vigour of the applied colours having disappeared, leaving a dingy, dull, faded-looking picture. Oil-coloured photographs, on the other hand, from the protection imparted by the vehicle, both to the pigment and the picture, appear to retain all their pristine beauty. We have been especially induced to make these remarks on a fact that has often struck our attention from a recent examination of some photographs charmingly coloured in oil by Mr. A. H. Wall, a gentleman with whose able contributions to the art progress of photography most of our readers are familiar. These pictures seem to unite all the truth of the photograph, to the vigour and brilliancy of the oil painting, and the delicacy of the ivory miniature. Some exquisite effects are also produced by a method, adopted by the same gentleman, which he terms "tinting in oil," a process very effective, quickly done, and easily learnt. We hope shortly to lay some details of the method, from Mr. Wall's pen, before our readers.

Talk in the Studio.

Photographic Society.—The first meeting after the Summer recess of the Photographic Society of London will be held at King's College, on the evening of November 6. A paper on "The Apparently incorrect Perspective of Photographic Pictures, produced by Lenses of different focal lengths, as usually viewed," will be read by Mr. Rothwell.

Photographic Exhibition.—The eighth annual exhibition of the London Society will be opened early in January.

Meeting of the South London Society.—A report of the proceedings of this Society, at the meeting held last night, will appear in our next.

Canadian Photographs.—We learn from Messrs. Notman, whose stereographs of Canada we noticed last week, that a set of their photographs was presented to H.R.H. the Prince of Wales, by the Provincial Government of Canada. The set comprised 55 sheets imperial 28½×20½, on which were mounted 10 photographs 22×18, 20 photographs 12×10, and 315 stereoscopic views—all of Canada. They were placed in two handsome morocco portfolios, with solid silver clasps. These again are contained in a case of bird's-eye maple, with solid silver mountings, handles, &c. One of the slides we received was a photograph of this presentation series.

Transferring Positives. — We would suggest to our readers who practise transferring the use of a convenient little implement for pressing down the cloth, leather, or paper on to the film. It is called a "blotting roller," and consists of a cylinder of wood about five inches long, fixed by a pin in each end into a frame of brass, in the middle of which is a handle It is in form similar to a printer's inking-roller. The cylinder is covered with several folds of blotting-paper. We purchased one in Chancery Lane for sixpence.

STEREOSCOPIC EXCHANGE CLUB.

We purpose next week to publish a list of the names and the addresses of those of our subscribers who desire to exchange their stereographs with each other. We think it desirable, therefore, to state briefly the conditions on which the exchange is to be conducted, in which we shall endeavour to embody such of the suggestions of our various correspondents as appear likely to secure satisfactory results to the members generally.

It is in the first place necessary that each gentleman wishing to avail himself of the facilities of the Exchange Club should, in forwarding his name, send specimens of the pictures he desires to exchange. It is not imperative that a print from each negative be forwarded, but such specimens as will enable the Editor to form a just opinion of the average merit, and consequent suitability for exchange, of the applicant's productions.

That each member write on the back of his pictures, if mounted, or on the waste margin, or a separate piece of paper, if unmounted, the name of the subject, and some particulars of lens, camera, process, light, length of exposure, date, &c.; by which means considerable interest and value will be added to the exchange.

We believe there is a feeling with many of the members in favour of exchanging unmounted impressions. We think that the system of sending them mounted possesses many advantages, and the facilities presented by the book post, make it no more expensive to do so. At present we believe the understanding is, that unmounted impressions are to be forwarded; it is important, therefore, that the prints be marked "right" and "left," as much trouble and confusion will by that means be avoided; the prints should also be untrimmed. Where mounted prints are received, however, it should be understood that mounted ones be returned.

After the publication of the list at present in formation, we think it will be desirable for gentlemen, in forwarding their names, to state expressly whether they wish to exchange mounted or unmounted impressions, and also the number of prints they are prepared to exchange; information on these points can then be appended to each name on publication, and much inconvenience and misunderstanding avoided.

In regard to the quality of the specimens received, we have pleasure in stating that they have all possessed more or less of merit; some of a very high order. It is, of course, understood that every gentleman will deal conscientiously in conducting his exchange; and we would just suggest to those of the subscribers whose productions are first class, who occasionally may receive something inferior to their own, that in sending their best in return, they will have the satisfaction of conveying one of two lessons—either a hint as to what really is excellent in photography, where their correspondent is wanting in ability: or an example of magnanimity, where he is wanting in sufficiently nice sense of honour, to induce him to send his best productions.

Finally, we would make a suggestion which will go far to meet any of the difficulties which may still exist as to a satisfactory arrangement. As some uncertainty must exist as to the prints to be received, whether mounted or unmounted, good or bad, &c., &c., we would suggest that, in all cases, a limited number be forwarded to commence with—say four. If these be satisfactory more can then be exchanged, and personal arrangements entered into for the style in which future selections are to be sent. If the first four be unsatisfactory, there is no serious inconvenience suffered, and no further exchange need ensue.

With very few exceptions we have, as we have stated, received satisfactory specimens with the name of each applicant; in the exceptions to which we refer we have received no specimens at all. However much we may regret it, we are compelled, in justice to the members at large, to omit the publication of such names.

Exchange of Large Pictures. We have received several communications on the subject of forming an Exchange Club of larger pictures than stereographs. We think, if the desire be general, a Club, distinct from the Stereoscopic Exchange Club, would be desirable—but based on exactly the same principles, and guided by the same conditions. In such case portraits might, with propriety, form an element in the exchange: we refer, of course, to portraits which should derive some interest from the celebrity or beauty of the subject. Many photographers are in possession of such photographs who have not landscapes, and many have landscapes who would be glad to exchange them for either portraits of celebrities or *genre* pictures. We shall be happy to receive further communications on this subject.

To Correspondents.

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H. Bellini's Discovery.—In answer to several correspondents regarding Mr Bellini's letter, and our promise to report, we may state that we called on Mr. Bellini several times, and were shown several positives and negatives which were stated to have been produced by the process described, but which presented to us every appearance of collodion pictures. On each occasion, owing to one alleged cause or another,—the preparation not ready, the wrong article supplied by the chemist, &c.,—he was unable to give us any practical illustration. The last time we saw him, a few weeks ago, he was about leaving the address where he then was, and promised to make some of his preparation, and leave it at our office that we might experiment with it. As yet we have not received it.

J. W.—A solution of corrosive sublimate will probably answer your purpose.

M. W. S.—The best distance between the front and back lens of a portrait combination is a question for a practical optician, depending on the foci of the lenses, and requiring much nicety in adjustment.

J. B., Cheltenham.—Your specimen is very good, and will secure the insertion of your name. We would mention, for your information and that of some other of our correspondents who may not be anxious to contribute more to revenue of the Post Office than is necessary, that parcels of stereo or other photographs, if open at the ends, come under the regulation of the book-post, the charge for which is at the rate of one penny for four ounces. Any letter respecting them, must, however, be sent separate. Your letter and stereograph in two separate wrappers would thus have cost two-pence postage; together charged as a letter, the postage we see was four-pence.

Isaac Hollis.—It is necessary to send specimens. The list will be published next week. We shall be glad to aid in the establishment of a club for exchange of large pictures: see remarks on the subject in another column. A light deal roller easily procurable would be a simple and certain protection to large prints in passing through the post. We agree in your remarks on the beauty of Jersey scenery. We know of no readily accessible spot presenting so many delightful bits for the camera

S. Ross.—See "Dictionary of Photography" in our last number and article on "Printing and Toning" in No. 107, a month ago. Stains in glass positives are more frequently from bad manipulation than other causes. A good developer is made as follows protosulphate of iron, fifteen grains acetic acid, fifteen drops, nitric acid, one drop, water, one ounce. alcohol, sufficient to make the solution run freely over the plate. State your precise difficulty in getting clean positives, and we will help you.

R. M.—The pose of your picture is the best part of it, and is really good. the head is, however, a little too much thrown back, which by foreshortening the head in a manner which has the effect of giving prominence to the chin at the expense of the forehead, and presenting the orifice of the nostrils unpleasantly, detracts somewhat from the effect. Your negative is wanting in sufficient vigour, and the print is not so brilliant as as might be desired: the tone is, of course, influenced by the same fact If the picture be the best the lens will produce, it is faulty. the want of sharpness may be, however, the result of bad focussing, or of the ground-glass and sensitive plate not falling exactly in the same place. Try if you cannot get a sharper negative, and and a little more intensity.

Dry Plate.—The description of your results appears very like fogging, but from what cause, whether collodion bath, or diffused light, we cannot say. A much stronger bath is generally desirable for dry plates

W. G. G.—Any gold remaining in the alkaline gold toning bath may be precipitated by photosulphate of iron, about three grains of which will be necessary to precipitate one grain of gold, which will be thrown down as black powder and may be filtered out. This may be melted into a button in the crucible, or made into chloride of gold. If the latter plan be chosen digest the precipitate with hydrochloric acid and water in equal proportions. The gold is, of course, insoluble in this acid, whilst the salts of iron present are dissolved, forming a yellow liquid. Repeat the process until the dilute acid remains colourless. The gold is now pure, and only requires the proper addition of nitric and hydrochloric acid in the usual manner to make chloride of gold.

F. C.—As your chief light is from the top, the white patch on the head, the consequence of direct vertical light, seems inevitable. If you stop out at least three or four feet of the light from the top, just over the head of the sitter, by means of a thick curtain, say of unbleached calico, close up to the glass, and if possible raise the front of your house from four feet to at least six, so as to get a little more side light, you will get better results. From your circumscribed position, this is probably the best you can do. Your formula for development is not bad; you may add to it about half a drop to the ounce of nitric acid.

E. H. B.—Your formulæ and manipulations throughout are so thoroughly intelligent and *en régle*, that it is difficult indeed to suggest the cause of failure. It would appear to be the old story—the paper The fact that some of the same lot gave good results would only prove that the sheets were of variable quality. Try another sample. Perhaps your negative lacks a little intensity. Possibly your silver is impure, so that your bath does not really possess the strength you calculate.

Ignorantia.—See answer to W. G. G. Precipitate the silver from the water in which prints are washed before toning by means of common salt, the silver will fall down as insoluble chloride of silver which may be reduced to metallic silver as directed in our former volumes. If the developing solutions are saved, the silver is reduced gradually, and will be found in a metallic powder at the bottom.

Amateur.—Possibly there may be some justice in some of your remarks, which shall be conveyed to the right quarter You are in error in your estimate of character, both gentlemen are well known and distinguished for artistic as well as photographic acquirements. Remember tastes will differ, and we must not forget the fable of the old man and his ass.

H F.—Mr Hardwich's Photographic Chemistry is published by Churchhill, price 7s. 6d. Chevreul's work on colour is published by Bohn, there is an edition at 5s., and another more valuable, as possessing coloured plates at 7s. 6d. Our publisher will send you either by post, on receipt of the amount in stamps

H. Anderson.—We do not quite understand your letter You describe your silver bath as 40 grains to 12 ounces of water. You must be in error. Write more clearly and we will be glad to help you.

Oxy., J. P Coram N. W, and several other correspondents, arriving late, are, together with much other matter, deferred from want of space.

THE PHOTOGRAPHIC NEWS.

Vol. IV., No. 112.—*October* 26, 1860.

THE PHOTOHELIOGRAPH.

The production of small, but perfectly accurate maps of the sun's surface is one of the latest and most beautiful achievements of photographic science, and one which is likely to lead to very considerable results. An atlas of the sun, if we may term it so, cannot fail to be a very novel and marvellous volume, and when studied by able men, will probably acquaint us with a great degree of certainty, with the formation and character of our great orb of light. This is certainly one of the noblest applications of our art it is possible to propose

The instrument which is used to obtain these delineations is the invention of Mr. Warren de la Rue, but it was suggested in the first instance by Sir John Herschell. It is termed the photoheliograph, a name which has its derivation from three simple Greek words which will occur to every reader. It is at present erected at the Kew Observatory at Richmond, after having voyaged to Spain and back again, serving in that country to take pictures of the late eclipse.

It is in appearance something between a telescope and a photographic camera. Let the reader imagine a square mahogany telescope with the smallest end fitted with an object glass $3\frac{1}{10}$ inches in diameter, elevated towards the sun, gradually increasing in size throughout the focal length of 50 inches, and terminating at the depressed end in the usual camera plate slide, and he will have a good idea of its external appearance. The plates used are six inches square, and the focal image formed by the object glass is 47-100ths of an inch in diameter, enlarged by other lenses so as to give a four-inch picture, which is the size adhered to in all the Kew observations. This half-telescope half-camera, is mounted on a cast-iron pediment fixed in the middle of the observatory floor, and stands about four feet in height. The camera has two motions, being mounted equatorially so that it may be made to follow minutely the continuous unhesitating travels of the earth. There is, besides, a clockwork arrangement in order to keep up accurately with the earth's pace during the course of the operation, but it is not a necessary part of the instrument, and its services are in practice dispensed with. There is also an external focussing apparatus which is also not indispensable. Both these arrangements are ingenious, but make the photoheliograph complicated and costly. They deserve this passing notice as being present in the existing instrument.

But now suppose it is a bright day, the few clouds are widely scattered, and tracts of uninterupted blue occur throughout the celestial field. This is a fine opportunity for getting a few pictures, and the dome of the observatory is moved round so that its window may face the glowing orb whose portrait is to be taken. The photoheliograph is then placed in its exact position, which is ascertained by a very simple mode. At the upper and elevated end is a common inch lens mounted externally: at the further and lower end is a scale placed on edge. When the light falls through the lens and marks a dot on a central mark in the scale the position is such as to imprint the image in the centre of the plate. Previously, the plate has been prepared and placed in the camera, and the light is shut out by a shutter or strip of metal about an inch wide, moving in the plane of the primary focus before the magnifying lens; this has in its centre an aperture, and the consequence is, that as it moves downwards the light streams through the slit on to the plate and is then shut off when the aperture has passed the magnifying lens and the solid metal of the shutter has come down in front. But this aperture has also to be regulated, it can be made longer or shorter at pleasure by sliding up and down a central slip, and according to the length of the aperture is of course the duration of the exposure to the light. This shutter is fitted to the bottom of the camera with a spring.

The great external "sitter" is ready to be "taken." The shutter is drawn up before the lens and held so in opposition to the force of the spring by a piece of thread which is drawn across two little rests after the fashion of a miniature tight rope. The instrument is gently moved as may be needed until the face of the sun is perfectly unobscured, and the speck of light falls on the centre mark of the scale. Then the operator, who stands with lighted match in hand, fires the thread; the metal shutter flashes downwards, exposing the plate through the aperture and then shielding it from the light. A fraction of a second only is consumed, and the photogenic film is traced with the undeveloped lineaments of our superb sun.

We have now to describe the pictures which result from this operation. Looking at one casually you behold a dark circle four inches in diameter, marked with a few irregular spots. Examine it carefully, and you will perceive it is delicately shaded, so as to represent the appearance of a sphere. This demonstration of the sun's spherical form is very clear and unmistakable. The spots have a regularity about their irregularity—the edges of the globe are slightly uneven and have a vapoury look. On further examining a series of pictures taken at different intervals, in the first you will perhaps find a spot creeping round the side of the sphere, in the second it is full in view, in the third it has crept up to the centre, in the fourth it is dying away in the distance, and in the last it has passed entirely away. There is no mistaking the identity of the spot in each photograph; the configuration is of a decided character, and is easily recognised in each successive plate. They have just the appearance of occasional mountains and lakes as pourtrayed on an ordinary map, and are many in number.

In order the better to trace the variations in the position of the spots, a cross-wired glass is placed before the enlarging lens, and gives a series of lines across the picture. It of course mars its beauty to have these ugly black stripes in the fashion of a plaid over it, but they materially add to its scientific value.

It is very desirable that a long continuous series of plates should be taken, from which, as a whole, fairer deductions as to the sun's physical features may be formed than can be drawn from the consideration of a few taken at irregular seasons.

AN HOUR WITH REJLANDER.

(From a "Photographer's Common-place Book."*)

For this week's paper I shall take one of the most recently inserted portions of the above-named book.

It is still true, as it ever has been, that folk will insist upon regarding your photograph as a species of microscopical curiosity, the chief beauty of which can only be visible through a magnifying lens. In vain you speak of its effect as a whole; call attention to the harmonious arrangement which makes each part so thoroughly dependent upon each other part; and talk about breadth, unity, and composition,—"Ah! yes—I see," responds your hearer, and —bob—down goes his eye to the glass he holds *an inch or two from the surface of your photograph*, and straightway you hear exclamations of "Wonderful!" "Bless me, what detail!" "How sharp!" &c., &c.

Whenever I am annoyed in this way, as I confess I very *very* frequently am, I feel inclined to draw a long breath, knit my brows sternly, and with one forefinger oracularly tapping the palm of the other hand, say slowly, emphatically, and rather fiercely,—"Now, my good Sir (or Madam, as the case may be), did you, in your great wisdom, ever chance to hear of a certain *very* ignorant, addle-pated, muff of a fly, who, when requested to give his idea of the architectural beauty of St. Paul's Cathedral, flew upon its mighty dome, and examining it inch by inch, concluded that it was not only very coarse, rough, and unfinished, but totally without beauty, utility, or design. *Did* you ever hear of this fly 'with *microscopic* eye?' because if you did why—but, there, never mind the application."

In the country, where I first became familiar with the practical operations of photography, I soon found that, while my respect for the art itself rapidly increased, it was not so with my respect for its professors: in other words, as the capabilities of the former widened out before me, the unworthy short-comings of the latter became more and more apparent. Sometimes, indeed, I chanced to meet an operator, who, true at least to the scientific mission of his art, prosecuted with eager and honourable ambition his search after useful knowledge and practical improvements; but in the majority of cases I found the photographer simply, purely, and ignobly—a mechanic.

With the feelings thus engendered I came to London some years back, eager to see a real photographic picture called "Two Ways of Life," then in the Photographic Society's Exhibition. I saw it, and no longer doubted that photography was a fine art. The production was by no means without defects, but I well know the wondrous chemical and mechanical difficulties which its producer must have encountered, and I said, warmly, "Rejlander is a true artist, and photography as true an art!"

The critics were just then very busy with this work, but they said, I remember, very little that I could consider either honest, just, or artistic. (I hadn't begun to feel my pen then, or I might have had courage enough to speak out in the strength of my own convictions.) Truly the prophet was in his own country. On one side I saw art critics, whose prejudices had been delicately and carefully nurtured among the dainty shams of conventional art, starting horror-struck from truths so whole, so literal, and so forcible; with their morbid sensibilities shocked, and their false fashionable taste violated, as they condescendingly whispered of its "ingenuity," and cried aloud that it was very "coarse." And on the other side I saw your photographic critics either loud in praises, given purely because *it* was photographic, and *they* were photographers, or deploring, in their profound ignorance of art, that effects which, with true artistic refinement, taste, and skill, Rejlander had laboured hard, long, and patiently to secure, had not been sharpness, distinctness, or brilliancy, as the case might be. There, you see, I'm digressing again. It was not the "Two Ways of Life," but my first pleasant interview with Rejlander, when, in company with my good friend the Editor of this Journal, I recently passed an hour with him, at a metropolitan hotel, that I sat down with you to chat about. So let us go at once thereto.

Behold us, four in number, sitting in the coffee-room of the —— hotel, before a table covered with the beautiful photographs of Rejlander, just tumbled out of their folios. Rejlander, with his fine *os frontis*, keen bright blue grey eye, and bearded chin: full of pantomimic action and genial cheerfulness, gives us information of value whenever he speaks, either to the Editor of this Journal, myself, or the military-looking stranger, who, after indulging in sundry distant peeps, is drawn irresistibly forward with a proffered request that he also may be permitted to look.

We are talking about Rejlander's more recent production, "*The Disciple.*" The stranger asks "Who was the original painter?" the Editor wonders "Where on earth he got the model from," and I am drinking in huge gulps of enthusiasm and admiration. You have seen or heard of this of picture course. It is a vignette of a head and a hand; and it would almost puzzle you to say whether the head or the hand was most full of expressive feeling. There is no other figure, but when you look at this Disciple you cannot fail to see the all-invisible Master; and, hushed in breathless awe, with intense admiration, and with reverential love, you and the Disciple hang upon his unheard eloquence; your lips parted, and your head bent eagerly forward, with widely opened eyes, from which the listening soul bends anxiously. Such is this photograph from the life.

"Much may be done with even the worst model," says Rejlander, bending the joints of an imaginary doll into an expressive *pose*, as he adds, "Remember how much expression you may even get out of your lay figure if you know how to go about it."

"If you know how to go about it," echoes the Editor, with a much more significant expression.

Next I take up "*The Head of John the Baptist in a Charger*," recently described in these pages. For two long years did that head walk about on a living body, in the eyes of one yearning for its decapitation. At length the opportunity came, the deed was done, he took it off, and there, on a napkin in the charger, it is before us; in all the solemn majesty of its martyrdom, with the damp and heavy locks of hair disordered by the executioner's hand, and the muscles relaxed and powerless. "I always saw that head as you see it now," says Rejlander; "that model never came before me without having his head in a charger. My conceptions, ideas, or thoughts, do not always remain so long as this one did; the precious visitors come at their own sweet will, and I am happy if they will but remain long enough with me to receive form and substance from my eager hands."

Speaking of the new alkaline gold toning bath, he tells us that "he had often longed for an opportunity of publicly thanking Maxwell Lyte for it, but had shrunk from a step which might assume, to ill-natured eyes, an appearance of indirect puff or flattery.

"Look here," cries he, "I have created a new goddess, the goddess Nicotina; it is a moral lesson, take a copy and show it to all smokers."

This is a photograph of a withered old hag, classically draped, clutching a tobacco vase in the one hand, and concealing her wrinkled bony face behind a placid and beautiful mask, from a kneeling votary, stretching forth an empty pipe. "Do you smoke?" asks the stranger of the moral preaching photographer. Rejlander makes a comically wry face, which he affects to conceal, and replies, "*Yes I do!*" So we all laugh heartily.

We next examine a photograph of two nude men wrestling. Every active muscle of the more prominent figure seems quivering in a state of extreme tension; the fingers are gripping desperately into the flesh, and so absolute does the action seem that one almost expects one of the twain to be hurled at once into the dust. An artistic student of anatomy, desiring such a subject, would certainly derive far more good from a study like this than he could obtain in painting from living models, inasmuch as from the appearance of extreme action in certain muscles not lasting more than a very few moments, the painter seldom succeeds in copying them so faithfully as they are given in such a photograph.

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* Continued from p. 293.

Pointing to a group of children receiving fruit from a female in a door-way, Rejlander tells us how most photographers complain that all the heads are not equally sharp, and almost invariably point to some of the accessories as sadly out of focus, because he had taken some pains to throw them back into their proper position in the composition. "They think the head of the broom yonder ought to challenge attention as readily as the head of my principal model."

A portrait of himself in the quiet enjoyment of a soothing "weed" amuses us. He thinks your cigar a great foe to the energy of action, and says he is always ready to procrastinate when so employed.

A charming little vignette of "*Photography receiving a Fee from the Painter*," pleases us vastly. Photography—the infant art—is represented by a dimpled little cupid, gracefully posed beside a camera, upon the lens of which is placed one of his plump little hands, while the other stretches forth a new brush about to be received by a hand bearing a palette, the fellow of which proffers the golden fee. Come, brothers of the brush, dismiss all silly pride and jealousy, foolishly cherished by you and your false friends, take this new brush in the spirit of gratitude and wisdom, as a means towards loftier ends than have yet been attained in art, for truth can have no better mate than the beautiful, nor the beautiful than the true; and their union can never be inharmonious.

"*Slaves make Tyrants*," the title given the next picture we examine. It contains two nude figures, one humbly prostrated, the other with head and form haughtily erect, and foot which grinds into the degrading dust the servile head beneath it. But, and herein lies the deep significancy of the story, the form of the slave is strongly built and full of muscular power, that of the tyrant is weak and fragile, with slightly developed, flaccid muscles; and altogether inferior in physical promise to the sturdy form on which he cannot even deign to glance. With what reproachful meaning might not such a picture have spoken to the strong slave Italy ere the puny tyrant Bomba was overthrown.

"*The Young Oak within the Old Oak's Arms*." The picture of a very old oak, so old as to have been mentioned in Doomsday Book, within the rugged bole of which a young oak has sprung up into vigorous life and health. To give new meaning to this scene we have an aged man, dressed in old-fashioned military costume, placing his arms around the manly form of a volunteer rifleman. To complete the story, you must know that this old tree is said to be haunted by a female spirit called the "Lady of the Oak," represented in the photograph by a ghostly shade, in flowing drapery, emerging in the act of benediction from the picturesque old ruler of the broad greensward.

"'*Tis dark without, 'tis light within*." The photograph thus named represents a blind woman playing a violin and singing the song from which the picture obtains the above title. At the first glance so simple and unpretentious is the composition, you take it for a mere ordinary photograph of some broad-faced, pock-marked ballad-singer from the streets, with high cheek-bones, hollow eye-sockets, and a wide mouth; but look again into that eyeless, upward turned face, mark its expression of introspection, and listen to the song "'tis dark without, '*tis light within*." How the ugliness fades before your aroused pity and sympathy now; how tenderly you begin to look into that ugly face, with its inward look; and, ten to one, but your hand is moving instinctively towards your purse.

"I saw her in the streets," says Rejlander, "attracted by the words of her song, I stopped, and, suddenly, it flashed upon me—there *was* light within. I got her to sing to me in my glass-room; when the expression I was so eager to secure came, I said, sing lower, now hum it (all of which Rejlander does), then off came the cap of my lens, and I said, exultingly, '*I've got it.*'" And sure enough, so he had.

Here's another picture called "*Take care of your Complexion*," obtained, we are informed in a similar way. Seeing some children at play, mimicking some fair dames they had recently seen by stepping mincingly along, holding up as parasols some rag-decorated sticks, and lisping affectedly the words above quoted, Rejlander stopped to amuse himself by observing them. One little fellow being unable to secure a "parasol" for himself cried "I'll hide my face," and at once buried it in the skirts of another's dress. Here was the suggestion. The artist took them home with him, talked and played with them until every feeling of childish timidity and reserve had departed, and then he (now unhesitatingly admitted as one of themselves) a child with children, began to play with them at "taking care of your complexion." So was the picture got, so it happened that not one of the little things stared wonderingly, with the usual expression of mingled fear and curiosity into the camera, that the photographed children are childish, and, moreover, like children at play. Here is a lesson for the photographic portraitist which he will do well to con.

But I must stop here, and see how much ground I have got over. * * * Well, I'm some distance past the stage I should have stopped at, and certainly must not go any farther until next week's horses are ready; so good-bye.

A. H. W.

SCIENTIFIC GOSSIP.

We gave an account in our last number of some interesting relations which had been noticed between the phenomena of dyeing and the chemical action of light. Our attention has since been drawn to another interesting case of the production of a colouring matter through the agency of solar radiation, which might doubtless be made available in photography. In some experiments on oil of cummin, M. Persoz, professor in the *Conservatoire des Arts et Métiers*, remarked that nitro-cuminic acid assumed a beautiful red colouration when it was exposed to the light of the sun. He afterwards found that this red colour was produced by the simultaneous action of light and heat. In fact if nitro-cuminic acid be exposed to the rays of the sun in winter, it remains white, and apparently suffers no alteration; but if, after insolation, it be heated, it immediately becomes red. This metamorphosis takes place in a very curious manner on a woven tissue. For this purpose dissolve nitro-cuminic acid in ammonia, thicken it with gum-water, and print with it on a piece of cotton, by means of a pattern mould. Upon soaking it afterwards in dilute nitric acid, the nitro-cuminate of ammonia is decomposed, and the nitro-cuminic acid is fixed upon the fabric, where it produces a white design. After being well washed the material is exposed to sunshine for about an hour, when the design takes a faint yellowish orange colour. After insolation the fabric is to be passed through warm cylinders, when the design will at once appear of a bright red colour, which, by appropriate treatment, can be transformed into a pure and bright rose tint. This reaction is very remarkable, and if it could not be employed commercially in the art of dyeing, by reason of the high price of nitro-cuminic acid, it might easily be made use of in photography, in which art it would prove a very useful and interesting addition to the ordinary printing processes. Nitro-cuminic acid is not difficult to make, the only drawback to its general employment being the high price of oil of cummin. In photography, however, this would not matter much, as the quantities required would be very small, and the cost, if made in quantity, would not be nearly as much as that of nitrate of silver, or some other chemicals in constant use in our art. Nitro-cuminic is a derivative from the oil or essence of cummin. This essential oil is obtained by distilling the seeds of the *cuminum cyminum* with water; it consists of a mixture of two oils, one called hydride of cumyl, and the other cymole. These two compounds may readily be separated by agitating the crude oil of cummin with a moderately concentrated solution of bisulphite of soda; a crystalline compound is thus produced, which yields pure hydride of cumyl when heated with a solution of potassa, and submitted to distillation. When this purified hydride of cumyl is heated with fuming nitric acid it is oxidized and converted into nitro-cuminic acid, the acid in question. The process for its manufacture from the essence of cummin (which is to be met with at the wholesale druggists), it will be seen, is not difficult, and we have no doubt that a very few experiments might place photographers in possession of a very useful and beautiful new printing process. The colour of the proof, a bright rose pink would scarcely be applicable to all subjects, but for some, especially statuary, it would not be unpleasing.

Some weeks ago we gave an account of some curious photographs of the recent solar eclipse which had been taken by Mr. Heisch, and in which was distinctly visible a mock sun, or moon, by the side of the eclipsed solar disc. When writing that description we mentioned that this appearance might possibly be due to internal reflection of light in the camera. This would at once be disproved if the appearances seen on the photographic plate were also observed in the sky. We have since heard that five or six people saw the same phenomenon of a parhelion in the sky when looking at the eclipse without the intervention of any glasses at all. This coincides with what was seen and photographed by Mr. J. R. Williams on the occasion of the previous eclipse. On that occasion, however, the appearance was that of a confused crescent; in Mr. Heisch's photographs we see a distinct disc in each of the pictures.

A patent has recently been taken out by a Mr. Smith of Birmingham for improvements in the manufacture of composition jewellery and ornaments, and cases for jewellery, photographs, &c. The specification presents some points of interest to photographers. The patentee takes one pound of shellac, or lac in any of its known forms suitable for the purpose, and liquifies it by heat on a flat iron slab; he then mixes with it an equal quantity by bulk of ebony dust, produced by sawing, turning, pulverization, or otherwise—and for purposes in which coloured composition is desired, he introduces the colouring matter at this stage: for instance, if he wishes to produce a very intense black, he adds three ounces of black, asphaltum ground to a fine powder, and three ounces of ivory black charcoal powder, or lamp black—the ivory black is used for the purposes of hardening the composition; if hardness is not required, he employs instead the charcoal, or lamp black. In making the composition of a chocolate, or brown tint, he uses with the lac three ounces of brown asphaltum, and about one ounce of rouge, more or less, according to the tint required; the proportion of rouge employed will of course materially govern the tint of brown produced. For green tints, or other darker shades, he employs any suitable colouring matter to produce the required effect. For light colours he takes the dust of boxwood (produced by any of the means aforesaid) as a colouring matter in itself, to which, if a still lighter tint be required, he adds an intense white, such as baryta white, or other suitable pigment. The whole of these ingredients must be well mixed until the mass shall appear thoroughly homogeneous in its nature throughout, where homogeniety is desired; but if streaked or veined composition be required this thorough amalgamtion will be less needful. A veined or streaked composition may also be produced by twisting or rolling together two or more masses of different coloured compositions. Considering the immense trade which is now done in photographic trays and cases, the above process, which seems peculiarly applicable to their manufacture, will be of great value.

A French gentleman, a P. P. Dagron, has also patented a microscope for exhibiting photographic views. The said invention relates to an improved construction of a dwarf microscope, by which it is adapted for making observations upon microscopic pictures, insects, flowers, and objects generally, and consist in a peculiar arrangement of the parts of which the said instrument is composed, by which it is reduced to so small a compass that it can be applied to a key, ring, pencil-case, toy, or any other portable article or ornament.

An improvement in the preparation of albumen has just been published; it consists in extracting it by suitable means from the roe of fishes. It is dissolved by means of water and concentrated by evaporation at a low temperature to avoid coagulation. If it were properly purified, this would be an extremely valuable source of albumen for photographic purposes.

ON THE PHOTOGENIC ACTION OF COLOUR.[*]

The paper which will be my pleasure in bringing before you tonight, is collected from facts which have been presented to my notice from time to time, and would perhaps, if thoroughly investigated, throw at least some light on the probability (or otherwise) of the production of photographs in natural colours. Every one using the camera must at times be struck with the surpassing beauty of the image on the ground glass, where every tint and varied hue is presented to the eye, as a charming little picture, almost surpassing nature herself. With what reluctance do we at times remove that glass, knowing, as we well do, that at most we can only secure the uncoloured shadow. What, think you, would be our joy, if we could but secure those lovely tints? with what pleasure would we plant our camera to greet the morning sun, and at evening to secure his parting rays.

This much by way of introduction, I will proceed to notice, what has been done toward this object? and I think I cannot do better than quote from a paper which appeared in the Photographic News, by Mr. Charles Martel, on the 20th of July last. (See p. 133 of our present volume.)

At times in developing with pyrogallic acid, parts of the picture will come out coloured, but invariably fades on drying, and during the past summer in experimenting on the Fothergill process, I have occasionally met with a picture with the sky of a fine azure tone, and the grass and foliage of a rich green, and, unlike the results in the wet process, remained permanent after drying. These pictures were taken in dull weather, and the colouring seemed to arise from prolonged development.

Satisfactory indeed it would be to obtain a coloured picture direct in the camera, but if it be true that substances which reflect a certain colour, will, by transmitted light, stop out that colour, and allow the colour which is complimentary to pass, then might we expect to obtain a negative from which we might print any number of pictures with the colours as they are in nature. In studying this I have been struck with the coincidence of this and the picture formed on the retina of the eye, for on looking at a colour for some little time, and then removing it, the colour complimentary to it will be seen; thus, if a red wafer be placed on a piece of white paper, and you fix your eye on it for a few minutes or so, and then remove it, a green spot will be seen; a blue one would produce orange, and so on. Now, looking at the eye from a chemical point of view, is it not possible that it may be supplied with a substance capable of being impressed by these different colours, and if so, we might enquire the nature of the impression, and the substance in which it is produced; this I give for what it is worth, but as I wish to abstain from any speculative ideas, I shall leave the subject and proceed to notice the more practical part of my paper, and shall ask your attention while I show the result of a series of experiments conducted by me during the early part of last month.

Experiment 1.—A disc of cardboard was divided into six concentric rings, or bands, and coloured with the three primary colours, blue, red, and yellow, and their complimentary colours, purple, green, and orange, and a photograph taken of it, and resulting in the blue coming out white; the red, dark grey, and the purple, light grey; while the remaining colours, yellow, green, and orange, made no impression on the sensitive film.

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[*] Read by Mr. T. Clarke, at the Meeting of the South London Photographic Society, on the 18th instant.

Experiment 2.—A transmitted positive was taken from a negative, on which three strips of coloured glass were fixed; the result being no action through the red and yellow glass, and it was evident from the appearance of the picture that the blue rather retarded than accelerated the action of light.

Experiment 3.—Two busts were placed in a box coloured grey inside, and so as to allow of no direct light falling on them (and arranged so as to produce as much shadow as the diffused nature of the light would admit), and a photograph taken of them, when the shadows were reproduced in a very correct manner, producing none of those black and white patches so often seen and so much disliked.

Experiment 4.—The foregoing repeated with a blue light reflected into the shadows, and which resulted in the entire destruction of all harmony and half tone, producing little besides a white patch with the bare outline.

Experiment 5.—The foregoing repeated reflecting into the shadows a red colour instead of the blue; this seems to have the effect of softening them down, but as the action, if any, was so slight, it is almost impossible to determine the exact effect.

Experiment 6.—The foregoing repeated reflecting a yellow colour into the shadows, which appears to have no effect whatever, either in diminishing or increasing the shadows.

Experiment 7.—A piece of blue glass was placed inside the camera, midway between the lens and the dark slide, extending to each side, and to the height of the centre of the lens; a photograph was then taken, which on development showed unmistakably that the blue glass stopped certain of the chemical rays. It may perhaps be worthy of remark that instead of there being any decided mark across the plate (as I had anticipated) it was nicely blended together. This, I think might be turned to good account, for if we were to put a piece of glass upright instead of lengthways against the side of the camera, we might soften down the side which receives too much light and so tend to harmonise the picture.

Experiment 8, and the last of these series, is merely a piece of sensitized albumenized paper, exposed to the action of the three primary with their complimentary colours; here, however, we find a difference in the action of colour on different photogenic substances, and it would be well to compare the results.

Albumenized paper.				Collodion.
Greatest action in the blue			... ...	blue.
2nd.	,,	,,	yellow	purple.
3rd.	,,	,,	purple	green.
4th.	,,	,,	green	yellow.
5th.	,,	,,	orange	orange.
6th.	,,	,,	red	red.

Of course the above table is only applicable to transmitted light. In glancing over these experiments there one or two points which deserve attention; the first which I would bring to your notice is the peculiar action of the red ray, for while it stands last in the scale by transmission, it is little inferior to purple by reflection. Some operators have observed in photographing flowers it sometimes occurs that a bright red flower will have as great actinic force as a blue one; this I think may be put down as a photographic unaccountable, if I may use the term, at least I think it is a matter that deserves investigation.

From experiments 3, 4, and 5, it will be seen that by reflecting into the shadows different colours, we may either reduce or soften them, but in my opinion this may be very properly dispensed with, as if the subject be placed in a good diffused light, the contrast of light and shade will be lessened, and although the exposure be somewhat increased the results will amply compensate for the prolonged exposure. The finest specimens of photographic portraiture I have seen have been taken in dull weather; most of the gentlemen of this Society will remember a portrait (being exhibited at one of our meetings in the last session) of an exceedingly pretty Irish lady, this, it was stated, was taken in a place entirely surrounded by houses and smoky chimneys, and I do think if more attention was paid to the proper diffusion of light and shade, we should soon observe a considerable improvement in our photographic productions.

ART, LITERATURE, AND PHOTOGRAPHY.*

We begin with that quality which, in certain degrees essento all art, is, in the highest degree, exhibited in photography. Imitation of nature is at once the fundamental idea and the perplexity of art; it is difficult to say whether it should be more followed or more avoided. All would agree that without imitation the work is unreal; lifeless if it has nothing but imitation. But on the method and the amount of imitation the warfare has raged in the schools from the days of Zeuxis to the days of Millais. We have never thought it of much use, on this curious and disputed problem, to repeat, as a solution, the fine aphorisms which no doubt, to the men of genius who employed them, had a vital meaning; to say with Sir T. Brown, that nature is the art of God; or with Goethe, that art is called art precisely because it is not nature. These sentences are available only for foregone conclusions. It is not even enough to say, although we thus approach a more practical definition, that in a work of art the scheme or whole should be more complete than nature would originally suggest, but that the details should be closely true to nature; that we may invent or select the characters, but that their words and actions must then conform to actual humanity. For the result thus obtained will always be incongruous; we shall have the groundwork magnificently impossible, and the filling-up tamely true; the story incredible, and the conversations insipid. How many novels and pictures of the season are already described in this description! Let us see whether an examination of practice may guide us to a theory. It is quite otherwise that a great artist, although unable to define his art, deals with his matter. We also cannot say how it is done; yet we see that he keeps a kind of inverse proportion between outward imitation and essential truth; that he gives the minor characters or less important detail with the most careful realization, the loftier characters and the critical points with the deepest vitality. Thus in "Coriolanus," the gossip of the streets is presented with almost literal exactness; the hero speaks in splendid poetry; his wife is described through her silence. Shakspeare has followed the manner of Plutarch in the citizens, he has idolized him in Caius Marcius, he has added a grace of which the good Chæronean was incapable in Virgilia. Every part is equally finished; yet the finish everywhere differs in character with gradations of subtlety which we feel but cannot analyse. The ideal and the real are blended by Shakspeare with such unaccountable skill, that each seems in its turn not only true, but the whole truth; as near perfection when Autolycus gives the catalogue of his basket as when a country-girl enumerates the flowers of Proserpine in verses which might have been envied by Sappho or by Theocritus.

> This is an art
> Which does mend nature—change it, rather; but
> The art itself is nature.

We see the same mystery transacted before our eyes in the arts of design. The governed gradation with which the finish is given in Titian's "Bacchus and Ariadne," or in Hunt's "Christ in the Temple," is more wonderful than the charm of the finish itself, and escapes, from its subtlety, the notice of any but reverent and loving spectators. Except by those who look thus, Holbein's work is pronounced too little generalized, and Tintoret's not sufficiently definite. So critics dogmatize. Meanwhile, unless we were Tintoret or Holbein, we could not hope to decide why these fine proportions of execution were observed. The difficulty here is analogous, in fact, to that which Science finds when she endeavours to explain the vital processes. To define how far imitation should be carried would require another art beyond art itself. Perhaps our conclusions should rather be, that detailed rules are dangerous, but that a few general limitations may be laid down with advantage, all dependent on the one cardinal principle of human art—that in no portion of it the creative working of the human mind shall not be perceptible. This principle at once excludes deceptive imitation; it requires that a certain organic unity shall be maintained—that accessories shall be subordinate in treatment, but never without bearing on the main purpose; that, whatever mode of presentment may in the particular work give the deepest truth, this shall be reserved for the rendering of vital character. This view of art seems to leave free play to "man, that inventive creature," and supersede disputes on imitation by removing the controversy from the technical sphere into the imaginative. It is satisfied when Stern attains his perfection by literalism, and Milton by ideality: it recognises that the plastic force of nature reproduces itself in art; that the idea of the work predetermines the method of its realization: that truth is accessible not by one road only.

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* From "Thackeray as Novelist and Photographer," in the *Westminster Review*.

The pride, however, of photography is its amazing literal reproduction; and though not to be altogether excluded from the precincts of art, yet undoubtedly it is distanced from art by the very success which it aims at. Its excellence is not the excellence of human skill. Thus a peculiar risk will attend the artist who should make his first studies in the school of minute literalism, and his first aim to photograph society.

Proceedings of Societies.

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South London Photographic Society.

The first in-door meeting of the season was held on the 18th, on which occasion, despite the unfavourable state of the weather, there was a full attendance of members.

The Rev. F. F. Statham, B.A., F.G.S., President, occupied the chair, and opened the proceedings by a few remarks on the unfavourable influence of the season on photographic experiments generally. He hoped, however, that even the disappointments of the season would be turned to account by affording interesting failures for investigation.

The minutes of the previous meeting having been read and confirmed,

The Secretary proceeded to call attention to sundry matters in connection with the Society, stating that

The Exchange Club was in a promising condition as to numbers, but that Mr. Hannaford complained that he could not procure sufficient prints to effect the exchanges already contemplated.

The claims of the folio would, he hoped, meet with a fair share of attention during the session.

With much pleasure he was enabled to state that the number of papers already promised for the ensuing meetings removed from the committee all fears on that head for some time to come. Members would perceive from reading the report of the last meeting how much it was possible this Society could do for the advancement of photography, did its funds permit; and the committee would further urge each individual of their number to exert himself to increase the yearly income of the Society. He also said that recognizing the high importance of public exhibitions as stimulants to competition, and as being greatly influential in raising the standard of public taste, the committee desired to express its sense of the fact by preparing for the next Photographic Societies' Exhibition, a large frame or two representative of this Society, and containing the best productions of its practical members. The name of each gentleman would be appended to his production, which must be submitted to the committee for their approval on or before the December meeting. All specimens not accepted for the same would be carefully returned without comment of any kind. For the sake of the Society and the art itself, the committee earnestly hoped each member would exert himself to produce at least one picture which should be valuable for its artistic and manipulatory qualities. He had no little satisfaction in announcing that the Committee of Experiment had been formed for the purpose of testing such new modifications, processes, and discoveries which might arise from time to time in the proceedings of Societies or the pages of the journals. The value and importance of such investigation and experiment, carefully conducted by competent members, and accurately reported, would form an important feature, which could not easily be too highly estimated. It was with much pleasure that he submitted the following list of able gentlemen who had kindly consented to act on this committee:—Messrs. G. W. Simpson, W. Ackland, J. Martin, T. Clarke, S. Tear, Eidman, Sebastian Davis, Blanchard, C. J. Hughes, Borchert, J. C. Leake, Mr. Hannaford, Hon. Sec.

Two large specimens were presented for the Society's folio, by Mr. John Bailey of Darlington, one of the Society's provincial members, whose presence he had much pleasure in announcing. One specimen was of a group of figures, and one a portrait of Dr. Alfred Taylor, well known in connection with chemical analysis, and one of the earliest photographic experimentalists, who, it may be remembered, proposed in the infancy of the art, the use of hyposulphite of lime as a fixing agent.

Mr. G. Wharton Simpson presented two specimens of the new permanent printing process, known as phototypes, forwarded to him for the purpose by M. Joubert. Mr. Simpson also exhibited some very fine specimens of M. Joubert's enamel photographs on glass, consisting of reproductions from photographs, engravings, and designs, some of which were in monochrome and others in various colours. They excited much interest and admiration.

A vote of thanks was passed to the gentlemen who had presented and exhibited these specimens.

Mr. Hughes then read an interesting paper "On the Mechanical Adaptation of Portrait Lenses to View Purposes," (See p. 290.) The paper was illustrated by the exhibition of the lenses described and their various appliances and capabilities fully explained. In addition to the lenses described in the paper, Mr. H. introduced one of his own arrangements, which was as remarkable for its extreme simplicity as the others for their ingenious complexity. In this adaptation the back portrait lens was removed, and the front one (reversed) simply screwed in its place; and the instrument was a landscape lens, the diaphragms serving equally for landscape and portrait purposes. At the conclusion of the paper

The Chairman made some remarks upon the importance to the progress and perfection of any art arising out of the ingenuity displayed in the improvement of its implements. He should have liked Mr. Hughes to have given his own convictions in respect to the value of such combinations of lenses in reference to each other, by way of summary to the whole. In so far as simplicity was preferable to complexity he thought Mr. Hughes' own arrangement was most economical and best in all respects.

W. Ackland, Vice-President, remarked, that in reference to the arrangement described by Mr. Hughes as Shepherd's, so far from it having been invented by that maker, the plan would be found described in the second, third, fourth, fifth, sixth, seventh, eighth, and ninth editions of "Horne and Thornthwaite's Guide to Photography." Its use had, however, been abandoned by that firm in mounting their lenses, for the reason that they never could mount a lens in that form, with absolute certainty, that the axes of the front and back lenses should coincide; and the lens Mr. Hughes had shown to illustrate the principle was faulty. He now found on examination that the adjustment was sensibly out. Moreover, the length of unnecessary tube thus given to the view lens, projecting behind the lens, would reflect light, and cause a halo, however much it might be blackened. These evils, and the impossibility of avoiding them by any contrivance in one mount, for the portrait combination and the view lens, had induced their firm to go to the expense of an entire fresh mount for the latter. Ross's arrangement was very ingenious, but it might be put together wrong, and he objected to those ingeniously complicated arrangements, because—however uncomplimentary to the meeting the remark might appear—if anything of this kind was given to photographers, where the parts would admit of displacement, or putting together wrong as well as right, they were certain to adopt the wrong method (a laugh). Everything of this kind, he was of opinion, should be so made that it could not be put together at all except in the right manner. He was now speaking from experience: it was a most common thing to have things sent back with a complaint that they would not work, simply because the photographer had exercised a little ingenuity to put something out of its place. They had had a lens sent back from India as defective, which, on examination, was found to have had the back lens put in the tube the wrong way after it had left their hands. They reversed the lens and sent it back and it was then pronounced quite perfect.

Mr. Hughes interrupted the speaker to call his attention to the fact that in the lens to which he was referring—Ross's—it was so made, that putting together wrong was impossible. It must be put together right, or not at all, so that no mistake could be made.

Mr. Ackland had not observed that. He was glad to see that his objection was removed. He proceeded to point out the disadvantages of various other arrangements, and stated that the mode of joining the tubes in some instances, by exercising pressure on the tube, had the effect of throwing the axis of the lens considerably out of truth. For that reason his firm went to the expense of two distinct mounts without any other advantage than that of sending out perfect instruments.

Mr. Eidmann observed that he would not recommend photographers to make one lens serve two purposes, as better results were obtainable with properly constructed view lenses.

Mr. V. Blanchard asked if Mr. Ackland's objections extended to Millet's arrangement, which appeared to him to meet all the requirements without producing the evils to which Mr. Ackland had referred.

Mr. Ackland thought it was all that could be desired.

Mr. Howard remarked that he thought it was in all cases desirable, where the front lens of a portrait combination was used with a view camera that two flanges should be provided, as the pressure on the tube in attempting to fix it to another camera, without proper appliances, would have a tendency to throw the axis of the lens out of truth.

Mr. Eidmann suggested the advantage of photographic societies possessing a glass-room in which facilities would exist for testing and reporting upon apparatus.

Mr. Wall replied the South London Society would be very happy indeed to carry out such a suggestion if their funds would permit it. Unfortunately the expense would be beyond their means, but he trusted that the Committee of Experiment, now in course of formation, would, to some extent meet the exigencies of the case.

Mr. Hughes said the Chairman had expressed a wish that he had in his paper given some summary, expressing his own opinion of the respective merits of the contrivances he had shown. Now that was the only thing he wished to avoid; he had aimed to do all but that. He was much indebted to the makers of many of the lenses for aiding him in bringing this matter forward by placing specimens of their various contrivances at his disposal, and it would have been an ungracious thing on his part to have subjected the appliances so lent to condemnation. He had endeavoured fairly to set forth the capabilities of each, and photographers must judge for themselves. It must necessarily be so, inasmuch as their requirements were so various. Some wanted a *multum in parvo*, one lens to do everything; others were delighted to be surrounded, like himself, at that moment, with a multitude of all sizes and capabilities. He might mention, as an illustration, that a wealthy amateur remarked to him the other day, that he had just purchased his one hundred and fortieth lens!—(Laughter.) He had no doubt but that in the various examples before the meeting every class of taste and requirement would be met. Some preferred simplicity, others complexity; but in the present state of our knowledge no man was qualified to decide authoritatively that this or that was absolutely best. Mr. Ackland had spoken disparagingly of the complexity of some arrangements, whereas here was an adaptation (Mr. H. then alluded to the one introduced by himself) which was simplicity itself, for it was only necessary to remove the back lens and replace it with the front one and it was ready for use; and it had this peculiarity that the diaphragms were moveable, and could be adjusted forward or backward to suit a photographer's emergencies, whereas all other single lenses had their diaphragms fixed in one plane. Could Mr. Ackland explain why they were always thus rigidly fixed. He concluded by suggesting to photographers the advantages of a cone to attach to the front of portrait cameras with an extra flange, which would enable them to use the same camera for portraits, views, and copying.

Mr. Ackland said the diaphragms were usually fixed, because if moveable photographers generally were sure to place them in a wrong position and then blame the lens for their own faults.

Mr. Leake asked if Mr. Ackland would be so good as to state for the benefit of the meeting, some simple method of "centring" a lens, or adjusting the axes of the respective lenses of the which combination was formed.

Mr. Ackland said that the method was a trade secret.

After a few further remarks from the Chairman,

Mr. G. Wharton Simpson read a brief paper on "Meagher's Improved Portable Camera." (See p. 291.) The arrangements and capabilities of the camera were shown by Mr. Meagher, and elicited general admiration.

The Chairman made some remarks on the protability and convenience of the camera, and remarked that the various movements it possessed gave photographers great facility for obtaining many desirable results, unattainable in a rigid camera.

Mr. Wall then handed round for the inspection of members a stereograph obtained as a direct positive in the camera.

Mr. Howard stated that the plate was prepared by the Fothergill process, with Powell's collodion. The exposure was four minutes; the plate was developed with a two-grain solution of pyrogallic acid, with half a grain of citric acid.

Mr. T. Clarke then read a paper on the "Photogenic Action of Colour." (See p. 304.)

The Chairman remarking on the interest and importance attaching to the production of photographs in their natural colours, observed that colour was a question of surface, and if it were true that collodion pictures sometimes showed colours, whilst wet, which disappeared on drying, that would indicate a direction for experiment, in order to preserve the same condition of surface in the film when dry, which it had possessed when wet.

Mr. Wall regretted that certain clever men had devoted so much time to the search after that which seemed so far removed from all hopes of attainment, viz., the securing of coloured photographs in the camera; and neglected to some extent a far more possible result, and one scarcely less important or necessary to the perfection of the photographic image, that of rendering more uniform the relative actinic influence of the radiations emanating from bodies of various colours, so as to represent their real chiaroscuro. He commended to the attention of the members some study of the great importance of a proper, or truthful translation of *hue* into *tone*, or, in other words, the gradations of monochrome.

The discussion on this subject was postponed until next meeting.

The following gentlemen were proposed and elected as members: — Mr. Hazelhurst, Mr. P. Meagher, and Mr. G. Triptree.

Mr. Wall then announced that a paper would be read at the next meeting by Mr. Alfred Hervé, "On the Positive Collodion Process," and a jotting by Mr. Hannaford, from the Experimental Committee.

The proceedings then terminated.

Photographic Tourist.*

A FEW DAYS ON DARTMOOR.

The sight from my bed-room window next morning, was the reverse of encouraging—wind, rain, mist, and misery. In by no means the most pleasant of humours I descended and took possession of the little back parlour. "What will'ee ha' for breakfast, sir?"—as if there could be any use in giving other than one answer to such a question as that, at such an out of the world place. "Us ha'n't got no bootcher's mait, nor no vish, nor ort but bacon, sir, an' eggs, sir." Of course, just as might be expected; bacon awfully salt, and eggs—well, good new laid eggs at all events, so bacon and eggs be it.

After breakfast I visited the Church. It is exactly such a quaint, little, old-fashioned building as one would expect to meet with in such a spot. High pews, in which the jolly, red-faced farmer can quietly take his after-dinner nap, and the rustic beaux and belles carry on their flirtations. The altar-piece will certainly draw the visitor's notice: a saint on one side turns in his eyes, and squints at a high-priest on the other, who, to balance the composition, turns out *his* organs of vision and stares at the saint.—In imagination let us suppose ourselves here on a Sunday afternoon. Over the pulpit the "sounding-board" still hangs, to throw down the sleepy voice of the sleepy clergyman on his sleepy and sleeping congregation. On the walls are written portions of Scripture, in large, staring letters, which try to catch the eyes of the sleepy congregation, look where they may, and bring them back to a dull sense of their duty. But the elders get sleepy and more sleepy, the beaux and belles continue their flirtations, the clergyman's voice grows more and more monotonous, the staring letters on the walls stare more fiercely, the saint continues to squint at the high-priest, and the high-priest to turn out his eyes at the saint, when "twang, twang," goes the fiddle, which rouses the flute, who has been dozing; his "toot, toot, toot," awakens the clarionet, who was fast asleep, and he in turn stirs up the sleepy congregation with a shrill squeak. A slate, with the number of the psalm to be sung chalked on it, is hung out from the choir loft,—probably wrong side out, thus notifying the second psalm appointed, instead of the first; then the parish clerk, in a sleepy, twanging voice, gives out the first two lines, when, in consequence of the error with regard to the said slate, the choir sing one psalm and the congregation another. This slight discord does not matter; the parson and "old folks" are too sleepy to observe it, and the young people are too busy with their love-making to attend to anything else, and as for the saint he squints at the high-priest, who stares at him in return.

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* Continued from p. 282

It was perhaps at such a point of the service as this, that "In the year of our Lord, 1638, October 21, being Sunday, and the congregation being gathered together in the parish Church of Wydecombe, in the afternoon, in service time, there happened a very great darkness, which still increased to that degree that they could not see to read; soon after, a terrible and fearful thunder was heard, like the noise of so many great guns, accompanied with dreadful lightning, to the great amazement of the people; the darkness still increasing, that they could not see each other: when there presently came such an extraordinary flame of lightning as filled the Church with fire, smoak, and a loathsome smell like brimstone; a ball of fire came in likewise at the window and passed thro' the church, which so affrighted the congregation that most of them fell down in their seats, some upon their knees, others on their faces, and some one upon another, crying out of burning and scalding, and all giving themselves up for dead. There were in all four persons killed, and sixty-two hurt, divers of them having their linen burnt, though their outward garments were not so much as singed. * * * The church itself was much torn and defaced with the thunder and lightning, a beam whereof breaking in the midst, fell down between the minister and clerk, and hurt neither. The steeple was much wrent: and it was observed where the church was most torn, there the least hurt was done among the people. There were none hurted with the timber or stone, but one man, who it was judged was killed by the fall of stone, which might easily happen, since stones were thrown down from the steeple as fast as if it had been by a hundred men."[*]

Although more than two centuries have passed since the occurrence of this fearful disaster, yet every minute particular has been handed down from father to son, to the present time. At many a winter's fireside in the moormen's cottages has the tale been told making the children creep closer to their mothers, and even the stout-hearted men to stir up the turf fire into a blaze and draw closer around it. The Rev. Mr. Rowe, in his "Perambulation of Dartmoor," tells us that one of the legends connected with this storm used to rivet the attention and excite the terrors of his childhood. "The tale passed current," he says, "that either a thunderbolt or a terrific minister of wrath in an unearthly form, was sent to inflict condign vengeance on one who was presumptuously playing at cards in his pew, by dashing him against the moorstone pillar, where the bloody evidence of his guilt and punishment, as it was believed, remained for a considerable period."

In 1786, nearly one hundred and fifty years after the event, the Rev. George Lyde, vicar of the parish, and Richard Hill, the schoolmaster, gathered and recorded the particulars of the occurrence, and inscribed them in large verse on a votive tablet erected in the church. At the risk of being tedious I must inflict some of this very original composition on you. It begins:—

"In token of our thanks to God these tables are erected,
Who in a dreadful thunderstorm, our persons here protected,
Within this Church of Wydecombe, 'mongst many fearful signs,
The manner of it is declared in these ensuing lines.

In sixteen hundred thirty-eight, October twenty-first,
On the Lord's day, at afternoon, when people were addrest
To their devotions in this Church, while singing here they were
A psalm, distrusting nothing of the danger then so near,
A crack of thunder suddenly, with lightning, hail, and fire,
Fell on the Church and tower here, and ran into the choir.

* * * * *

They all, or most, were stupified with that so strange a smell,
Or other force, what e're it was, which at that time befel;
One man was struck dead, two wounded, so they died few hours after,
No father could think on his son, or mother mind her daughter.

* * * * *

One man had money in his purse, which melted was in part,
A key likewise which hung thereto, and yet the purse no hurt,
Save only some black holes as small as with a needle made;
Lightning, some say, no scabbard hurts, but melts and breaks the blade.

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The wit of man could not cast down so much from of the steeple,
Upon the Church's roof, and not destroy much of the people.
But He who rules both air and fire, and other forces all,
Hath us preserved, blest be His name, in that most dreadful fall."

So far I have said but little on photography, but now being fairly on the moor, the reader may shortly expect to find my camera at work. I trust, however, that these necessarily dry remarks on antiquarian and local subjects, will not be uninteresting to the amateur photographer, who cares for other things besides mechanically taking a picture, and feels some slight interest on matters that throw light on the habits and customs of his forefathers.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 24th October, 1860.

In my last letter, I mentioned some remarkable life-sized portraits, the productions of M. Wothly, which so vividly excited the admiration and surprise of those who had the good fortune to examine them. At that date I was unable to state anything definite as to the method by which they were obtained. Since then, however, the artist, M. Wothly, has mode a communication, from which I take the following extract:—

"I have arrived at unexpected and unhoped-for results, by a combination of resources, which almost constitute a new art. An optical arrangement, similar to that of the *heliostat*, gives me a large bundle of rays, rigorously parallel, which pass through a negative obtained on a collodioned half-plate, bearing with it the (positive) image, and expanding into an immense cone of divergent rays which impress the image on a sheet of sensitized paper. The intensity of these rays is sufficient to produce a positive, when we employ solar light, in from fifteen to twenty-five minutes; the regularity of their path and distribution is such, that the picture is as clear and as sharp at the extreme borders as at the centre, even when the picture is eight feet high by five feet broad. To reduce the duration of the impression to the shortest possible time, I have had recourse to new combinations of sensitive agents. For operations of washing, toning, and fixing sheets of paper, so difficult to handle, I have substituted manipulations, as rapid as efficacious, for impossible dishes, baths, &c. My half-sized and full-sized portraits have, I think, a peculiar character, which is very attractive and pleasing to the artistic eye, resembling good lithographs, the productions of very skilful draughtsmen, so harmonious and and well blended are the tones. I may add that they are almost permanent in the light, because my fixing process secures them from all risk of sulphuration."

This is very interesting so far as it goes, but we must await further details before we can arrive at a knowledge of the "secret" by which these portraits are obtained. It may

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[†] Prince's "Worthies of Devon."

form the subject of a patent, in that case our curiosity will be gratified.

M. Sabatier, whose method of obtaining transparent positives was indicated in your journal of the 12th inst., has since published minute details of his process, and of the accident that led him to the present results. It appears, that while attempting to strengthen a negative partially developed by pyrogallic acid, by means of a process employed to produce it by protosulphate of iron, that is, in alternating pyrogallic acid with a weak solution of nitrate of silver, instead of obtaining a more perfect negative as he wanted, he obtained a positive which he did not want, and a more perfect positive than he could obtain by the usual processes, for the picture abounded in detail almost microscopic. The antennæ, the wings with all their fine nerves, the peculiar mechanism of the feet of the common fly, were represented in a most vigorous image.

This accident has frequently occurred in the operating room, but the important results to which it might lead were not followed up till M. Sabatier took them in hand. The cause of the anomalous result remained to be searched out, that which appeared the most plausible was, that the sensitized film had accidentally been exposed to light during the manipulation. Right or wrong, it set M. Sabatier on a new track, and resulted in his formulizing what we may appropriately term the amphi-positive process, that is, a picture that is positive both by reflexion and transmission.

If, after taking in the camera the latent image of an object, alternately black and white on a sensitized collodioned plate, the action of the developing agent be suddenly arrested at the moment the lights of the image begin to appear, we remove the developing solution by means of a stream of distilled water, and then cover the plate immediately with a solution of nitrate of silver of the strength of four per cent. provided no free acid be present in the bath and developing solution, if of sulphate of iron, the following will take place. The lights of the picture will remain as they were at the moment the pyrogallic acid was removed by the distilled water, but in the course of a minute or two we shall see that beside the lights of the faint negative the darks appear and form a true positive.

From this experiment it is evident that a solution of nitrate of silver poured on a plate in which the development has been suspended will not continue that development, but to the combination already effected, it causes another combination of a different colour to succeed, giving rise to a positive. Doubtless the positives obtained in this manner are only imperfect, but they serve to demonstrate their origin.

The positive succeeds the negative, or rather the sketch of a negative. The collodioned plate on being removed from the camera is impressed by the light not only on the parts corresponding to the lights of the image, but also in those corresponding to the deepest shades. This can be proved by most conclusive experiments. The positive as well as the negative is therefore the result of the action of light. But if it be the result, it ought not to be produced in the inverse ratio of the cause, which determines it to exhibit itself most vigorously, just in those parts where the light has acted most feebly.

To assert the contrary would be absurd. The positive obtained by the new method, is not the result of a luminous action but of an embryo negative. All the molecules which do not concur in the formation of the embryo negative, and those only, are acted upon by the nitrate of silver, which causes them to assume the black colour, and as these molecules are more numerous in those places where the embryo is least advanced, the black colour is more or less deep precisely in those places where it ought to be. Thus the positive is impossible without the previous negative, and it is also impossible when the negative is completely developed.

In many of the arts the rapid and economical production of carbonic acid gas is an affair of much importance. M. Mauméné has suggested the following method, which has much to recommend it.

In a retort containing about 100 lb. of good chalk or whiting heated to redness, inject a small finely divided jet of steam. The disengagement of the gas takes place immediately; the quantity of gas given off by the tube of the retort is nearly half a gallon per second, or 1500 gallons an hour. Although the gas is given off so rapidly and continuously it is quite cold. It is only necessary to keep up the steam. To obtain 2000 gallons of gas requires the evaporation of only 4½ gallons of water. Its purity is proved by the fact that it is entirely absorbable by potass.

M. Saint Edme has made some interesting experiments on the passivity of iron. When a piece of this metal is immersed in ordinary nitric acid it is violently attacked by the latter; if it be withdrawn the adherent acid continues its action. When the acid has disappeared from the surface of the metal it is again immersed in the nitric acid, the coating of rust is dissolved by the liquid, and the iron becomes dead white, but is no longer attacked, it has become passive. If it be rubbed it again becomes attackable, and can be again brought to the passive state.

It is probable that the iron, when exposed to the air imbibes some acid, forming a layer of sub-oxide of iron, which is not attackable by nitric acid (this sub-oxide is formed only in the presence of air, for when the iron is not withdrawn from the acid the action of the latter continues). Upon reimmersing the iron in the liquid the coating of peroxide is redissolved, but the film of sub-oxide protects the iron against the action of the nitric acid; but if this film be removed by friction the acid resumes its action.

If the iron covered with the acid be made red-hot, and immersed in the acid in that state, it is not acted upon by it, the rust disappears in the liquid, and the iron becomes dead white: it is passive. We can then rub it without its losing its passivity; the coating of sub-oxide appears to have become very adherent to the iron, and can only be removed by sand-paper or by the file.

Photographers, who are such large consumers of silver, will be gratified to learn that a very rich mine of that metal has recently been discovered in the territory of the Argentine Confederation. This, together with the discovery made last year of very rich silver mines in Utah, the richest ones in fact, ever known, will serve to relieve the growing anxiety as to probable scarcity of that metal, in the face of the immense drain of it to China and the East Indies, very little of which ever returns to Europe. It must also be remembered that the silver employed in photography is for the most part lost to commerce, finds its way into the sea in fact, and may some day realize the suggestion that by appropriate arrangements the coppered bottoms of ships may, after long voyages, on their return to port, be found thickly plated with silver, recovered from the "washings" of extravagant manipulators.

M. Schoenbein concludes from certain experiments he has made that oxygenized water results from the slow oxidation of certain metals. To the list of metals capable of producing bin-oxide of hydrogen, previously published, we may add, bismuth, aluminium, the almalgams of iron, chromium, nickel, cobalt, and manganese. Tin and its amalgam produces oxygenated water only when the water with which they are agitated contains some drops of sulphuric acid. Mercury, silver, gold, and platinum, do not, under any circumstances, cause its production.

Chloride of potassium, which is usually met with under the cubical form, is found in long prismatic needles in certain vegetable extracts. The analogous fact has never been established with chloride of sodium, although many chemists have discovered it under a number of different forms. M. Tuson, upon opening a box containing a paste made of the ova of the salmon, which had remained closed during three years, found that the organic matter was covered with needle-shaped crystals, which, upon analysis, proved to be sea-salt, or chloride of sodium.

M. Leussen has sought to obtain the equivalent of cadmium by means of its acetate. Three successive operations have given us the equivalent of oxide of cadmium 63·950—63·988—64·441, or a mean of 64·026, from which it may be concluded that the equivalent of cadmium is 56.

M. Gerstein's malleable metallic alloy seems likely to render important services to the arts. It is simply an amalgam of chemically pure copper with mercury, which, in its plastic condition, possesses the property of serving as a solder for metals, and as a cement for glass and porcelain, to which it adheres strongly. At the expiration of ten or twelve hours it becomes sufficiently hard to take a polish, like brass or silver.

Dr. Wood, of Washville, Tennessee, U. S., has patented a new fusible metal! It is an alloy of cadmium, tin, lead and bismuth, which melts at a temperature of 150° to 160° Fah. The proportion of the constituents may vary according to the qualities desired; but the following may be taken as a basis. Cadmium one to two parts, bismuth seven to eight parts, tin two parts, lead four parts. This mixture melts at 40° lower than Rose's or Newton's. Its fusing point may be lowered to any extent by the addition of mercury.

Photography in Germany.

Elberfeld, Oct. 22, 1860.

A singular application of photography to industry is now executed on a large scale in this town and the neighbourhood. You know, perhaps, at Elberfeld and Barmen are the most considerable manufactories of metal buttons (for dresses, waistcoats, etc.). A few months ago one of the manufacturers conceived the idea of introducing small photographic portraits into the middle of these buttons. (I enclose a specimen.) He ordered some, and now it has become a complete fashion, so that hundreds of grosses of these little pictures are produced every day. The method of proceeding to obtain them at the lowest possible cost is thus: one hundred to one hundred and fifty lithographic portraits of known persons are mounted upon a large board, and copied in the camera with a three or four inch lens, as collodion positives; the development is effected with proto-nitrate of iron, producing brilliant whites. After fixing, and before the film has dried the margins of it are cut off by a knife: a sheet of fine unsized paper, which has been previously wetted, is laid upon the collodion, and pressed against it in order to remove the air-bubbles, and to make it adhere firmly. With a sharp pen-knife, or a steel pen, the film with the paper is carefully removed from the glass and transferred to a japanned iron plate. After pressing the paper to the iron the collodion film adheres to the plate, and the paper alone can easily be removed. A good crystal varnish is then applied to the plate, and the latter is cut by a machine in as many small round pieces as there are portraits. You can conceive that in this manner a photographer having a man to prepare the plates, and another to transfer the film, can produce an immense number of pictures in one day. The portraits most in demand seem to be those of Garibaldi; they are ordered at the rate of four to five hundred grosses at once.

I am working, at present, for trial, with a negative nitrate bath, containing eighty grains of silver to the ounce, which is, as you know, very much stronger than usual. Of course the collodion contains nearly 1¾ per cent. of iodides, and the bath is saturated with iodide of silver. I find the negatives to be very fine in modulation.

Could one of your readers communicate a suggestion to make the positive chloride of silver paper more sensitive for the enlarging process? I used bichloride of mercury, but without great success.

In collodion iodized with potassium sometimes small transparent spots are remarked, notwithstanding the bath and collodion being quite clear and filtered. I have found that they often arise from allowing too much time for the plate to *set* before dipping it into the bath. Perhaps a crystallization takes place in that time. With the same collodion you may have an immense quantity of spots if you let it set a very long time, and a clean plate in shortening the time of setting. I do not know whether in every case this remedy is of use.

In English journals I often see the question asked, which is the process originally given by Mr. Fothergill? Perhaps it will be interesting to your readers to have a description of this process, communicated last month to the *Photographisches Archiv*, by Mr. Fothergill.

A. THE SOLUTIONS.

1. *The Bath.*—Eight parts nitrate of silver, one hundred parts distilled water; saturated by iodide of silver, and rendered *slightly* acid by addition of acetic acid.

2. *The Albumen.*—One ounce albumen, two or three ounces distilled water, six or eight drops of ammonia, beaten.

3. *The Developer.*—A saturated solution of gallic acid in distilled water; or, two grains pyrogallic acid, one ounce distilled water, twenty to thirty grains acetic acid.

B. THE PROCESS.

I suppose the *wet* process to be already known. A glass plate is coated with collodion, and after sensitizing in the bath (1) it is washed in a bath of distilled water until the greasy streaks have disappeared. This bath can be used until it contains ¾ per cent. of nitrate of silver.

The plate is drained one minute, and afterwards coated with albumen (2), which is to be poured first upon the driest edge of the film; then a second coating of albumen is applied round the margins of the plate to ensure homogeneity of the film. After half a minute the coated plate is brought into a bath of distilled water, moved up and down about thirty times, and well rinsed with water to remove the last traces of albumen. After the plate has got superficially dry an artificial heat of about 100° F. is employed to dry it thoroughly. The prepared plates retain their sensitiveness the longer, the more complete the albumen has neutralized the free nitrate of silver.

To keep the plates sensitive many months, before drying let them remain a quarter of an hour in two per cent. solution of chloride of sodium, and wash again with distilled water.

To make the plates more sensitive they may be coated with a mixture of one part saturated solution of gallic acid, and four parts of distilled water; but in this case the artificial drying is not applicable.

A collodion of porous structure is the best, it must adhere firmly to the glass, and be used after it has been iodized at least three weeks (not with cadmium salts). A little free iodine is of advantage.

I did not find an addition of chloride of ammonium to the albumen (instead of ammonia), render the plates more sensitive to light.

The chief causes of failures are the following:—

Badly cleaned vessels, handling of the plates with fingers dirty from albumen or nitrate of silver; use of old eggs; humidity of the glass plate during the application of the collodion; alkalinity of the silver bath; unequal drying of the plates in a too small room; the plates becoming humid after drying, and keeping them in deal boxes.

P. L. Liesegang.

Photographic Notes and Queries.

Copying and Cleaning Daguerreotypes.

Dear Sir,—Would you oblige me by answering, through the Photographic News,—1st, Is it possible to take a collodion positive of a daguerreotype? I have tried it, and the picture was fogged. 2nd. The daguerreotype has the appearance of a coat of steam over the surface, with a few clear spots upon it. Would the treatment at page 131, vol. ii. clean it without danger? as I should rather keep it as it is than run any risk of losing it, being a portrait of a deceased friend.—Yours, &c.

J. P.

[It is quite possible to take a collodion positive copy of a daguerreotype, but it requires care to place the latter in such a position that it shall not reflect white light into the camera. The best plan is to place it on a box lined with black velvet, only open at the front. A little care and skill are all that are necessary. 2. The foggy looking film may be removed without difficulty from your daguerreotype; and without risk if you are careful. Make a solution of cyanide in distilled water, the strength is not important, from twenty to thirty grains to an ounce. Before applying it, the plate must be wet with distilled water all over: if the water do not flow freely, as if the plate were greasy, wash the plate with alcohol, and then flood it with water until it run smooth and freely. Now apply the cyanide solution, watching carefully the progress; the film of oxidization will quickly disappear; and the moment it is gone plunge the plate into a dish of common water, and rinse well, finally using distilled water. Then dry off in the usual manner with a spirit lamp. We have cleaned some hundreds of daguerreotypes so without difficulty. If you are unaccustomed to daguerreotype manipulations, take care in drying to hold the plate by the pliers at one corner, letting the water drain in that direction, and assist the plate to dry steadily and evenly by gently blowing at the upper part of the plate; at the back of which the flame of the spirit lamp is applied.]

STEREO EXCHANGE CLUB.

Ellmore Buildings, Montreal, Canada East, October, 9, 1860.

Sir,—I am a member of the Stereo. Exchange Club, and think with many others, that it is unsatisfactory in its present arrangement, which was to be expected in a first trial. Just now, if I see the address of any member is near, say some old cathedral or other place of interest, I send him some views; in return hoping to receive some of the places I desire to see. Instead, the chance is, that I get some from the other end of England, the result of last summer's holiday. Now, do you not think that at a very small expense, which I am sure most of the members would not refuse to pay, a list of each amateur's negatives might be forwarded to you with two or three specimens—of course I mean those which he intends to exchange—and these lists combined could be printed on a separate sheet and sent round with the News, this might be "ventilated" as the Yankees say, and in my opinion would be found to work well—the expense could not be great. I have a selfish reason besides, viz., we have no old cathedrals, churches, ruins, &c., and comparatively few places of historical interest, but we have Niagara, and many other places which I know that I, while I lived "at home," would have been glad to have to exchange against these English views, and it is provoking to get your returns in the dark.

I see a downright libel quoted from the *Times* in your News lately in speaking of the Montmorenci Falls, (which do not by the bye, disappear under ground save into the depths of the correspondent's imagination, but spread over a sort of gulf near a mile wide at the mouth) that views of these places are not to be obtained here, the truth being, that one of our first professionals in Montreal has taken many hundred views, and sold, *many many thousands*, of very fine quality, besides many large ones of Niagara, &c., 22×16, equal to the best of the productions of the first class English artists. Pray excuse the length of this and make what use you like of it.—I am, Sir, your obedient servant, Alex. Henderson.

ARTIFICIAL LIGHT FOR PHOTOGRAPHY.

Sir,—The application of artificial light to photography seems to many of your correspondents of equal interest as it does to myself. In a pamphlet issued by the Lime Light Company, that Light is said to be "applied with perfect success to the purposes of photography." Perhaps some of your correspondents who might have the facility of trying it will say how far they have been successful, how to make the gases, the description of lamp, &c.

If your correspondent "Oxy-calcium," will stitch his cloth together about a quarter of an inch from the edge, open the seam or turn it one side, cement it, and tap it with a hammer to make it adhere, apply a thin coating of cement on the top, let it set, apply another coating and cover all with some stay binding, I think he will be successful.—Yours, &c., G. Coram.

22, City Road, Cambridge.

P.S.—I shall be pleased to supply further information if required.

CEMENTING INDIA RUBBER CLOTH.

Dear Sir,—Let your correspondent "Oxy-calcium" lay on three or four thin coatings (each to be thoroughly dry before the next is applied) of india rubber dissolved in benzole, or any of the ordinary solvents, taking care not to soil with the fingers the parts to be joined. When *quite* dry, put together the edges and rub down with a smooth cold iron.—I am, dear sir, your obedient servant, Churk.

MORE TONING DIFFICULTIES.

Aspatria; Carlisle, Cumberland, Oct. 20, 1860.

Sir,—By this post I have sent three stereo pictures. The third print (of Kirkstall Abbey) is, you will notice, covered with red stains. Will you be kind enough, if possible, to point out to me the cause of the stains? I use Lyte's process, and use every care in printing, toning, &c., not to touch the prints with my fingers, yet in spite of all I can do the prints are more or less of them stained—indeed, more of them get stained every time than were the previous time, and the last lot (24) I tried (of which this is one) were every one stained. It is very provoking and discouraging, and if you can point out to me the probable cause you will particularly oblige.—Yours, very truly, Later.

[Try omitting the use of salt and water, and wash the prints prior to toning in distilled water. Sometimes the use of salt, and of water containing lime causes a filmy deposit on the print in patches, which effectually prevents toning in those places. Keep the prints well moved about whilst toning; if they stick together they will stain. Ed.]

Hints to Operators.

Cracking Large Negatives.—Mr. Rejlander states that he has recently lost several valuable large negatives in consequence of their cracking when heated for varnishing. The circumstance at first puzzled him, as he had not applied a greater heat than usual. On a little reflection he discovered the cause, he had warmed the large plates by a small fire, which only heated one part of the glass at a time, and thus by unequal expansion caused the fracture. His advice is:—never heat a large glass by a small fire.

Treatment of Over-printed Positives.—Over-printed positives, which are usually regarded as spoilt, and positives obtained from over-developed negatives, may be made available by treatment in the following bath, which reduces the depth of colour, and produces a general harmony:

Cyanide of potassium . . .	15 grains.
Water	1 pint.
Liquor ammoniæ	1½ drachms.

After the over-printed positives have been toned, fixed in hypo, and well washed, they are put into this bath one at a time, and allowed to remain for four or five minutes, according to their intensity, and until the details in the shadows come out. During the operation the bath should be covered in by a close-fitting sheet of glass to prevent the escape and inhalation of the fumes of prussic acid given off. The solution must not be used a second time.—H. Vernier, *Jun.*

Cleaning Glasses.—A method of cleaning glasses very much praised by American operators is as follows:—In the first place let it be premised that it is impossible to clean glasses in a cold damp atmosphere, as the moisture condenses on the surface faster than it can be removed. The plate should, therefore, after a preliminary cleansing with dilute nitric acid, be warmed until it is considerably warmer than the atmosphere of the room. One drop of "burning fluid" is then poured on the middle of a plate stereo size, and instantly polished off very smartly with a tuft of clean cotton wool, or what is better, a pellet of clean tissue paper. It requires but a few moments rubbing to collect all the organic matter on the surface, after which further rubbing is useless. ["Burning Fluid" is a mixture of alcohol and camphine, one part of the latter to four of the former. We believe imperfectly cleaned and damp plates are a fruitful source of *blisters* in dry processes.—Ed.]

Talk in the Studio.

Photography for Caricature.—In a recent interview with Mr. O. G. Rejlander, an account of which, by our talented contributor A. H. Wall, will be found in another column, we saw, amongst many other good things, an application of photography to caricature which struck us, as illustrating, in a marked degree, the power and tractableness of photography in competent hands. It is entitled, "Shell your coat, sir?" and represents an old Jew clothesman accosting a stalwart volunteer. The old Jew is an inimitable resemblance of the French Emperor as *Punch* would depict him; the volunteer, with a shrewd grin, points his thumb over his shoulder, saying, as plain as words can speak, "Over the left." Notwithstanding the alleged realism of photography, this picture is as full of humour as one of Leech's best caricatures in *Punch*. Referring to this subject, we may mention that Mr. Wall, in a Lecture he is now preparing on Caricatures and Caricaturists, for delivery in the Lecture Hall of the Scientific Institution, Walworth, on the 20th of next month, intends to avail himself of the droll effects of extreme spherical aberration amongst his illustrations.

Impostor.—A person, calling himself Professor Kastner, is, we understand, going about the country, with specious pretences, victimizing photographers and dealers in photographs, by obtaining goods on fraudulent representations.

Experimental Committee.—The first meeting of the just organised Experimental Committee of the South London Society was held on the evening of the 23rd instant. Its labours promise to secure most valuable results from the high character of its members as practical, experienced, and accomplished experimentalists. The subject adopted for its more immediate experiments being the dry processes generally, the collodio-albumen processes, and Messrs. Petschler and Mann's modification being selected for immediate examination. A sub-committee was elected to test (as a short step to establish the possibility of securing a dry process which shall possess sensitiveness and other qualities equal to wet collodion) Dr. Hill Norris's plates, and report upon how far they fulfil the conditions claimed for them. The members of this committee hereby invite communications from gentlemen who have individually experimentalized in this direction.

STEREOSCOPIC EXCHANGE CLUB.

The following gentlemen have complied with the conditions of the Exchange Club. In one or two instances it will be seen that a note is attached stating that all the prints are mounted, and in one case where one subject only is ready for exchange. If any error exist we shall be glad to correct it if pointed out:—

J. S. Overton, Market Place, Crowle, near Bawtry (all mounted); J. H. Jones, 12 Williams Street, Swansea; Geo. J. Tear, East Kennington Schools; Louis D'Elboux, The Poplars, Freemantle, Southampton; F. Walker, 34 Crosby Street, Maryport; S. Clifford, Australian House, Hobart Town, Australia; Wm. Henry Bacon, Orchard Street, Sheffield; A. Elsden, North Crescent, Hertford; Wm. Ralph, Solicitor, Ulverston; Thos. Mercer, 32 Queen Street, Great Harwood, near Blackburn, Lancashire; Joseph Beldon, Bradford (12 copies); George Sheldon, Compton, Petersfield; Wm. Bartholomew, Fareham; J. Bull, Anglesey Villa, Painswick Road, Cheltenham (one copy); Emil. Seelig, 2 Bloomfield Villas, Park Road, Stoke Newington, N.; A. F. Halford, Alderson Street, South Shields; Baynham Jones, Selkirk Villa, Cheltenham; Frank Howard, 12 Whittingham Villas, Studley Road, Clapham; G. B. Shepherd, Hythe (large and small); A. F. Stafford, Alderson Street, South Shields; Wm. B. Harwood, Laburnum Villa, Chiddingfold, near Godalming, Surrey; John Hollingsworth, Higher Hurst, Ashton-on-Lyne; A. Copsey, Long Melford, Suffolk; Dr. Boley, St. Martin's, Guernsey; W. Palmer, Lynton; N. C. Camm, Nailstone Rectory, Hinckley; John G. Livesay, 30 Penny Street, Portsmouth; Wm. Stonehouse, 4 Abbey Terrace, West Cliff, Whitby; Joseph Lucock, Aspatria, Carlisle; Geo. Smith, Wolverhampton Street, Dudley; Alex. Henderson, Ellmore Buildings, Montreal, Canada East; Isaac Hollis, jun., 5 to 11 Weaman Row, Birmingham; Edward Palmer, M.D., Bracebrige, Lincoln; Thomas Clarke, Shooters' Hill; A. R. Mowbray, 2, Corn-Market Street, Oxford.

A supplementary list will be published shortly for the convenience of photographers who may desire to be admitted in the exchange.

To Correspondents.

N. W.—Develope with protonitrate of iron to produce vigourous positives with white metallic lights. There is an excellent formula on page 245 of our last volume. Pure proto-sulphate of iron is of a bluish green, and persulphate is a reddish brown; protosalts of iron possess their value as developing agents, in virtue of their tendency to absorb oxygen, in doing which they pass into persalts, and lose their deoxidizing or developing power. We prefer a 35 or 40-grain silver bath for positives, with a full proportion of nitric acid.

Oxy.—As a worker in brass you may doubtless make an oxyhydrogen blowpipe for yourself; but it would be desirable for you to see and examine one first, as it is difficult to give sufficient instruction by mere description. The form is something like the letter Y inverted so ⅄. The oxygen tube joins one limb, and the hydrogen the other; the two gases mixing in the single limb or stalk, which must terminate in a fine aperture, like an ordinary fish-tail gas burner. The trouble and expense of recovering the silver from old collodion films would scarcely be repaid by the results. If the film were always removed whilst wet, the silver might be dissolved out by means of cyanide of potassium, &c., and recovered in the usual way. If the dried films were saved and burnt the same as cuttings of paper there might be some risk of explosion, as we believe the gun-cotton still retains its explosive qualities.

Geo. Smith.—We will insert your name. In all cases send the best. The "Wren's Nest" is very interesting, and we shall be very glad to see a large print of it. We are gratified by your good opinion.

Calx.—All organic matter entering your nitrate of silver bath will tend to throw it out of order. Use as much care as possible to remove the isinglass from the back of the plate.

S. Artidge sends us a collodion positive of an ingenious case he has contrived in which to keep his bath. It consists of a pyramidal box in which the bath is enclosed. About two-thirds of its height from the base it is hinged, and opens for use. The lid serves the double purpose of preserving the bath from dust, &c., when not in use, and preventing the admission of diffused light during the immersion of a plate. He also sends us a design of a drum-shaped projection attached to the front of his lens, within which he has contrived a spring shutter for the instantaneous closing of the lens, which is useful and ingenious. The transfer sent is very good, we shall be glad to know the method by which it is effected. The lenses you name are unquestionably high in price, but they are also unquestionably of first rate quality. You may by chance get a cheap or low-priced lens of good quality, but it is only by chance. In the case to which you refer you pay for the certainty.

Geo.—Your attempt at colouring is not bad for a beginning. You will require practice to acquire more facility and neatness in laying a simple wash, one of the chief things required in colouring stereographs. The work to which you refer on colouring is a valuable guide in this and other respects. The "general wash" referred to is manifestly intended to be applied over all the face, except the deep shadows, into which it must soften and blend. Your failure with Petschler and Mann's process arose from imperfect washing before exposure. Soak well, or irregularity and stains will frequently ensue; distilled water is not necessary for the washing. Your view on the Tees, interesting to us from old associations, required a little longer exposure and less development. The water would not have been so much a white patch, nor the foreground possessed so many black hard shadows. Make a little improvement and we will insert your name in the Exchange Club if you wish.

A. Bennet.—The use of solution of iron double the usual strength will, under some circumstances, admit of a little less exposure, but the quality of the picture will generally be worse, and the risk of fogging much greater. The formula for the varnish you name is a trade secret. You can buy it, and varnishes generally, much cheaper and better than you can make them. See formula for turning positives into negatives in No. 109.

Copying Camera.—An ordinary view lens will answer very well for copying. Mr. Dallmeyer states that his triple combination is pre-eminently suited for giving the best results in copying. The diameter of a lens does not regulate the field it covers; that is regulated by its length of focus, it is found necessary for successful results that the diameter of a lens and its length of focus should increase in a proper ratio. The dimensions of a copying camera must entirely depend on the required size of the copies and the focus of the lens. If for instance you wish to copy a whole plate picture its full size, and the focus of your lens be twelve inches, your camera would require to extend twenty-four inches, or double the focal length of your lens. See a very useful table just prepared for the "Photographic Almanac," which will appear shortly.

Coram.—Oxide of silver is best to correct the acidity of your bath if it proceed from nitric acid. It is made by adding caustic potash to nitrate of silver. Take a drachm of the latter and dissolve in three or four ounces of distilled water, to this add, a little at a time, a solution of caustic potash, one part in eight of water. Continue adding and stirring until there is no further deposit. The oxide of silver will be thrown down as a brown powder, wash well in three or four changes of water before using. No. 75 of the Photographic News out of print. The others can be had.

Bra an Keenly.—Your plan appears possible; but experiment would best determine the question.

W. H. Warner sends us an account of some experiments with walnut "hulls," or green covering of the walnut, the expressed juice of which he has applied to albumenized paper, and obtained by the action of light a deep brown tint. The juices of flowers and vegetables have already been tried as recorded by Mr. Hunt; but we do not perceive that anything has been done to utilize the idea. Will Mr. Warner oblige us with the sight of one of his prints so produced.

Thos. Hawkes.—Atmospheric clocks are to be bought at many fancy shops in London; we do not remember the address of the wholesale depôt, but believe it to be in Fleet Street. Possibly we may be able to say in our next.

A Young Lady.—If our fair correspondent will favour us with one of the prints of which she complains we shall be better able to help her, as we are most anxious to do. The paper you have named we believe to be good.

M. B. N.—See answer to Later in our "Notes and Queries."

An anonymous correspondent is thanked for the extract.

Isaac Hollis, jun., Geo. Benson, H. Goble, Hypo, Thos. Clarke, and several others in our next.

THE PHOTOGRAPHIC NEWS.

Vol. IV., No. 113.—*November* 2, 1860.

THE COST OF A PATENT.

Perhaps there is no science or art the discoveries and improvements in connexion with which are more difficult to secure by means of letters patent than photography. The progressive nature of the art and the intimate connexion of all its processes with each other, so far as fundamental principles are concerned, render it very difficult to define patentable improvement. Perhaps one of the most unquestionable discoveries in photography after the first grand discovery of the art itself, was the collodion process. No attempt was made by its lamented discoverer to secure to himself its advantages by patent; but there were not wanting many of the scientific men of the day who, conscientiously enough, only saw in it a modification of the calotype process, the film of collodion and the sheet of paper—both really consisting of a layer of celloluse as a support for the sensitive salts of silver—being regarded as identical. This one illustration will serve to show the difficulty of defining patentable improvements in photography, and suggest the difficulty which would occur in defending many already in existence. As moreover, the entire onus of the defence of a patent falls upon its possessor, who must protect himself by the slow and cumbrous process of a Chancery suit, the cost of which when gained very often falls on himself, the inducements held out to the inventive genius to patent his photographic discoveries are reduced to a minimum. And it is a noteworthy fact that the majority of photographic patents which have been secured, have been sources of loss rather than gain to their possessors.

Apart, however, from these considerations, there is a spirit of communism among photographers, which is altogether opposed to the restrictive and protective operation of patent laws. Photographers as a body are pre-eminently free-traders. Perhaps nothing has tended so much to induce and cultivate this *esprit de corps* as the influence of photographic societies, in which, it has been remarked, men of the most diverse lives, habits, and stations are united, so that whoever enters their ranks finds himself in a kind of republic, where it needs but to be a photographer to be a brother. The wealthy amateur and the professional photographer, the man of science, and the working operator, there freely impart their treasures of theory and fact, to aid the progress of the art in the cultivation of which they are enthusiasts. Improvements and discoveries made by individuals are thus constantly becoming the common property of photographers at large.

It cannot be denied, however, that there are many instances in which discoveries which have cost their authors months or years of study and experiment, and sometimes the expenditure of much money, and that these discoveries constitute a legitimate source of profit in one way or other. The inventor has a perfect right to property in his ideas. Sometimes that property is best secured by preserving the secret of the discovery intact, the inventor working it only for his own advantage, whilst at other times a patent is the best protection. However it may serve the purpose of the inventor, there can be no doubt but that in many instances the public are better served by a discovery being the subject of a patent, than by its being preserved a secret. In the former case, not only are the public for a consideration made participators in the advantages of the discovery, but as one of the conditions on which protection is granted, is the full and satisfactory publication of every detail connected with the discovery, this very publication is often both suggestive and stimulative of further discovery. At the present moment a discovery scarcely inferior in importance to any in the art—we refer to an efficient, practicable, and easy method of permanent carbon printing—remains comparatively lost to photographers by its preservation as a secret. A technical difficulty exists as to protection by patent, owing to some inadvertent partial continental publication, the inventor in order to secure that property in his idea, his right to which no one can deny, is compelled to preserve the process and all connected with it an unapproachable secret.

We have no intention at present, however, to discuss at large, the question which opens out before us. We have been led into these preliminary remarks in preparing, as interesting to many of our readers, a few details of the cost of patents, which have been within the last few years made much more accessible than formerly. From a little work before us* we learn that in the United Kingdom and Colonies, up to the year 1852, "the cost of securing an invention in England, by letters patent, was from £100 to £120; in Scotland, £90; in Ireland, £120; exclusive of the specification; making a sum total of at least £320 for these three countries—all the money being paid in advance, before the invention was protected. Under the present law of patents, however, an invention can be immediately protected for six months for £6 6s., to £8 8s., this sum including every expense. If desired, a patent may be obtained for three years in all three countries—England, Ireland, and Scotland—at an expense of £24 9s., to £26 9s., exclusive of the complete specification. At the expiration of three years the patent may be extended to seven years on payment of £50 more; and at the expiration of seven years, it may be extended to fourteen years, on payment of £100 more; thus affording an inventor an opportunity to test his invention for a short period, instead of being obliged to pay a large sum of money for a patent for fourteen years, as was formerly the case.

"The first step to be taken in applying for a patent is to obtain provisional protection, which may be effected in about ten days: the Government does not require drawings until six months after this step.

"After provisional protection is obtained, the next step is to give notice of intention to proceed with the application, so as to pass opposition; this notice must be given at the latest within four months from the date of the provisional protection, otherwise the right to a patent will be forfeited. The expense of this step, including fees for stamps and agency, is £5 15s. After the above step, the expense of proceeding to complete the patent under the great seal, including the Goverment fees for three years, and agency, is £12 6s.

"The protection takes place from the first application for the patent. With all applications for patents, a provisional specification or description of the invention must be prepared and deposited with the Government—which is not open to public inspection; upon this specification the provisional protection, as also the validity of the future letters patent, is grounded." Any reticence or secrecy being practised here will, we understand, invalidate the patent.

"The provisional protection of an invention, when granted, is advertised by the Government in the *London Gazette*;

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* "The Inventors' and Patentees' Assistant." By B. Browne and Co., King William Street, London Bridge.

also the notice of proceeding to a complete patent, so that in the latter case opposition may be entered where it may be supposed the grant may interfere with another inventor's rights.

"The protection in one patent, under the great seal, includes the whole of the United Kingdom of England and Wales, Scotland and Ireland, with the Channel Islands, and there is now no extra expense if it be granted in more than one inventor's name. The letters patent are made out for fourteen years, with all fees paid for three years, subject to the option of extending the right to seven years, and fourteen years, as before stated.

"In addition to the first or provisional specification, another or final specification must be prepared and filed with the Government, within six months from the date of provisional protection, under the condition of the letters patent when granted. This document requires a £5 stamp, and the average expense of preparing the same may be reckoned at £7 further; except when drawings are necessary for the proper explanation of the invention, duplicate parchment copies of which must be filed with the specification, thus making the entire cost of a patent for the United Kingdom about £40.

"The expense of an opposition to the grant or progress of a patent is to the opposed £4 11s., to the opposer £6 11s."

The protection of designs, as regards "shape or configuration" in apparatus, &c., may be effected by "registration" under an especial Act of Parliament, having altogether different conditions to patents. Provisional registration, the cost of which is from £3 to £5 protects a design or model for twelve months, during which time it may be exhibited by the inventor, but not manufactured for sale. At any time during the twelve months complete registration may be effected, which confers protection for three years for the United Kingdom. The Government fees for this protection are £10, the cost for the requisite drawings, &c., however, may nearly double that amount.

The mode of securing redress in case of an infringement of the inventor's rights is much more simple and easily effected here than in the case of a patent; a penalty of from £5 to £30 being imposed on the transgressor, which is recoverable by summary proceedings before the magistrates. A penalty of from £1 to £5 it also imposed for using the word "registered" on any article without authority.

Ornamental designs are protected at a still less cost under another act, the fees imposed varying in amount.

AN HOUR WITH REJLANDER.

(From a "Photographer's Common-place Book."[*])

To return to Rejlander. The next picture we take up is an excellent conception, called "*Old English Oak*," being the portrait of a jolly old tar from Greenwich, hard, square, weather-beaten, and in every point a perfect model. He is drinking "The Queen! God bless her!"

A pretty little cupid-like figure, palette on thumb, and brush in hand, with head upcast in the attitude of inspiration, is called "*Infant Art*."

This old misanthropical, keen-eyed, shaggy-browed model with a lantern, peering forth suspiciously from the deep shadows beneath his ragged brow, and clad carelessly enough in dingy, classic drapery, is entitled "*Diogenes*."

"*The Female Head-dresser*" is full of humorous meaning and artistic management; here, as in all the others, the choice of models displays the highest imaginative qualities, and the keenest observation in the artist.

"*Portrait of a Boy*." Ah! this is a real portrait, not a mere photographic representation of the dress and features, with the latter perfectly flat and inartistic, in order that the former may be clear and well defined, but a genuine picture of the mind and feeling within, without which all those eloquent muscles now speaking to our souls as well as our eyes, would be unnaturally silent and death-like. Don't you see why this is? That lad isn't sitting for a picture; not he. Rejlander had given him slate and pencil to use, and he is using them at the very time when, disturbed by the artist, who with his hand on the cap of the lens, requests him to "hold hard for a second or two." It has often struck me that we shall never secure really first-class artistic portraits until we have a dry process which shall possess sensitiveness and other qualities equal to wet collodion. As it is, if, as our painters do, you wait for the expression, which can alone give real value to any likeness, either your plate has been too long out of the bath, or during the time occupied in its preparation, the soul which had flashed so brightly out has again gone in, and all is once more monotonously dull and uninteresting. Therefore is it that I look forward with considerable interest to the result of those experiments undertaken by the "Experimental Committee" of the South London Society, which, as you know, have been directed into this channel. It will be a glorious thing to sit down with your sitter, and chat him into the proper state of animation, and then after a rapid and comprehensive glance at the ground-glass, slip in the slide, off with the lens, and, presto! there you have a face with a soul in it—instead of a mass of quiescent muscles and expressionless features.

We next take up some "*Studies from the Nude*." Well, what is the suggestion here? Gross and indelicate? Anything at all like that created by a sight of those partially nude abominations now disgracing so many London shop windows? By jingo, I guess not! Refined and ennobled by art, real beauty, palpable flesh and blood; speaks of nothing but its own inherent loveliness. If you want lewdness go to that ugly, sensual face, that leering mass of dissipation, and loose-skinned, flabby immorality; there in all its hideousness it will appeal to kindred minds, to eyes which never yet saw beauty, to souls which never felt its holy charms; but here, *here* there is nothing but that beauty which is closely allied to all that is sacred in earth, sea, and air. Is there nothing ennobling and pure in nature, that it must be disguised in the conventional habit of degenerate modern art before it is presented to our eyes? The great old masters strove to be true to nature, and painted real women, why should not we be as true and photograph them? There's a lot of questions I've indulged in, but don't be alarmed, I shan't even "pause for a reply," which we very well know cannot possibly be made until I've done, and next Friday has arrived.

"*The Toilette*." If you want to study "breadth," here is a fine illustration of the quality, only the background is somewhat too uniform in tone. What a beautiful model she is!

There are numerous other specimens before us, but I am afraid of becoming tedious. Speaking of educating the eye for art purposes, Rejlander tells us he once had a strange idea that it might even be so tutored that it would recognize the molecular disturbance effected by the action of light. Once he exposed a plate with the camera safely shielded in his dark tent, and watched the image on the sensitive surface; he got a magnificent lesson in colour for his pains, but nothing more. This idea had originated in the very peculiar sensitiveness he experienced in regard to the presence of actinic influence. Frequently when at work he had detected the photogenic intruder before his eye, had recognised the presence of light. He regrets that "Two Ways of Life" as a purely tentative experiment, had not been received more encouragingly, for then he should have executed others far surpassing it. It was but bitter fruit when, after expending so much labour, thought, and time, the production turned out to be such as neither did any apparent good to others nor rewarded him.

The time has, I fear, not yet come for artistic photography, and we cannot expect to find many martyrs to the cause of art in men whose hands and brains are their sole estate.

Speaking of his interview with the Prince Consort, Rejlander warmly praises his Highness as a genuine lover of true art, and one who thoroughly understands its attributes and perfections. Referring to the photographic societies and their seemingly small appreciation of artistic elements in photographic practice, he compliments your humble servant for certain poor exertions made in connection with that in the South for introducing papers of an artistic tendency and character. (Dear reader, are you an artist? if so, come and aid these exertions, in a society whose members are anxious to give to art the culture and respect it so justly deserves.) But you can't stand here gossipping with me all day, I know very well, so here ends subject No. 3 from a "Photographer's Common-place Book." A. H. W.

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[*] Continued from p. 303.

REMARKS UPON ARTISTIC POSITIVE PRINTING.

Having frequently, in our earlier photographic experiences, suffered unutterable disappointment at the meagre appearance of prints, from some negative we had thought just one degree above perfection, and having long since learned that the fault lay not in the negative, but in our ignorance of its peculiar requirements, we have been induced to record the results of some experiments in printing made some time since, and which we have found valuable.

To those who have passed through the bitter ordeal of the thousand and one failures, the patient study of which will go a long way towards making a successful photographer, these experiments may prove uninteresting; but should they, even in the slightest degree, dispel the fog which besets the path of every earnest photographic enthusiast (and where is there a beginner in photography who is not enthusiastic), or even act as a rushlight to make his path dimly discernible, we shall be more than repaid.

Our first experiment was with the negative of a church interior. It was very fine in details, but the streams of sunlight that fell upon some monumental slabs on the floor, and upon the carved finials of the pews, made the high lights so dense, that when the print came from the frame, the delicate carving was nearly obliterated by what appeared a heavy fall of snow, while the deeper shadows were completely bronzed. The paper had been prepared upon an 80 grain bath, and printed in the shade. We reduced the strength to 50 grains, and printed another. In this a marked improvement was apparent. We had more detail in the lighter parts, but much was still lost in the carved wood-work of the roof, and in the delicate drawing of the shadows. Our next sheet was sensitized upon a bath reduced to 30 grains and printed in sunlight. We had now all the details in the high lights, everything was perfect but the roof. We glazed this portion of the negative on the back side with transparent yellow not too deep in colour, and had now a negative that gave perfect results.

We would here say that much may frequently be done to improve negatives beautiful in many respects, but too strong in contrast between high lights and deep shadows, by a slight glaze on the wrong side of the negative of transparent yellow here and there. How frequently a portrait is entirely spoiled because the eyes are too heavy, a touch of yellow on the wrong side will prove, in the hands of the skilful photographer, a speedy remedy for a "black eye."

In negatives produced by iron development we have frequently met with some perfect in detail, but lacking intensity. When the ordinary sensitizing bath has given a feeble impression, a bath of 100 grains of silver and printing in diffused light, has generally given us presentable results.

We would lay it down as a rule for the printing of feeble negatives, wanting in contrast, to employ a bath containing not less than 100 grains silver to the ounce of water, and to print in diffused light. While for harsh negatives we would employ a bath not exceeding 40 grains silver to the ounce of water, and print in direct sunlight. The rays of the sun will penetrate the densest parts of the negative without bronzing the deepest shadows.

Sometimes in the taking of negatives of sitters arrayed in dark garments, the back ground in printing will be exactly of the same tint as the local colour of the dress, and in consequence the figure will have no relief in the finished picture. This may frequently be remedied by shading that part of the back ground touching the shadow side of the face for a few minutes with a piece of card or brown paper, moving it slightly outside the pressure frame on first putting it out to the light. Let it now print without assistance until nearly done, and look to see if a little more shading is necessary.

When imperfections occur in the back ground of negatives otherwise good, they may be frequently got rid of, or at any rate they may be much subdued, in the following manner:—print as usual, and remove from the pressure frame. Place the print upon the outside of the frame, and with a piece of brown paper torn somewhat in the shape of the figure, protect the image, whilst the back ground is speedily toned down by the ready pencil of the sun. Be careful to keep the paper in motion during the operation otherwise a harsh shadow will be produced. We have sometimes cut out the image from a waste impression, and have employed it as a mask. But there is a danger (even with a thickness of glass between the mask and the print) of destroying the delicate boundary of the image—outline we will not call it—for Nature has none, and Sol, when left to himself, would scorn to descend to the poor subterfuge of artistic mortals.

We are by no means recommending "dodges," but how frequently does it happen that the best picture is the most faulty. There is a perversity about the inanimate articles in the dark room of the photographer, that is, to use the very mildest word, provoking. It is reserved for the photographers of this experimental age to have trials of patience completely out-Jobing Job. I would ask, why is it necessary that the sitter's happiest expression should choose a dirty glass for its final resting-place, whilst the stolid face lacking intelligence, or at best wearing a smirking, self-satisfying look, should repose securely upon the faultless glass? or why collodion should split itself with delight at having produced a satisfactory negative, thereby marring all it has made, whilst it is tough and hardened against all our ill usage from vexation at its mediocre productions? But we will leave these questions, for we know the echo's answer.

In the queries of correspondents in this and other photographic journals, we have frequently seen complaints of a difficulty in preventing patches of unequal colour in toning, whilst others cannot succeed in inducing the print to tone at all, or at best their efforts produce but a brown of brick-dust hue. We believe the first of these failures to be caused by the adding of salt to the first water into which they immerse their prints—or by adding salt in excess. Either of these mistakes will form a film of chloride of silver upon the print, which is very adhesive, and which cannot be easily removed even by rubbing with the finger. The gold has no action upon this film, and when the print is immersed in the hypo-bath, the hypo removes the white deposit, and it is apparent by the difference of tone that the gold solution has produced no change of colour where these patches have been.

The second of the failures we mention—the inability to make the gold solution tone the pictures—is caused, we believe, frequently by the employment of old negative baths for the sensitizing of paper. Even where the bath has been evaporated until it has become very rich in silver, the iodide in solution is a fatal barrier to the willing efforts of the gold-toning solution. We have tried the addition of fresh silver to an old bath, but the results have been always unsatisfactory in tone, in proportion to the amount of iodide present, besides the imperfect tone there is also an amount of woolliness most objectionable, and also a great want of surface definition. Some papers of course give much richer tones than others, but where pure silver has been employed, and the gold has not been decomposed in the mixing,* but used of the proper strength, we believe tones harmonious and agreeable to the eye may be produced upon any of the regular photographic papers. Many complaints have been made lately of the prevalence of blisters in the paper during toning and fixing operations. We have frequently had blisters when we have employed carbonate of soda with the gold upon Rive paper, but upon Canson or Saxe with phosphate of soda and gold we have never had a blister.

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* Some of the varieties of phosphate of soda are not readily soluble except

In manipulation we always allow a grain of gold with 20 grains of phosphate of soda to 10 ounces of water for a sheet of paper 22½×17½, which will make four 10×8, six 8½×6½, or 21 stereoscopic pictures: if the good nature of the gold be taxed beyond this, expect not good tones.

We always employ fresh hypo for fixing, and let the prints remain three minutes after all the mottled appearance has vanished. When the prints are held up to the light they should look like beautiful transparencies upon ground glass. If the prints are hurried out of the hypo bath, or an insufficient quantity of hypo has been employed, they will most certainly turn yellow in course of time.

V. Blanchard.

SCIENTIFIC GOSSIP.

A novel idea in advertisements has just been brought under our notice. Our readers will remember that a few weeks ago we drew attention to an ingenious plan devised by Professor Dove for the detection of counterfeit medals, and we then took occasion to mention another beautiful optical experiment whereby he was enabled to distinguish a reprint from the originally printed page. In his "*Optische Studien*," he likewise gives a specimen of stereoscopic printing to illustrate the double refraction of Iceland spar as seen in binocular vision. This effect is produced by printing for the left eye lines in the ordinary manner, while for the right eye the lines are slightly advanced. Upon combining these two by means of the stereoscope the printing appears to be in two planes more or less distant from each other. Should the spacing of the two not correspond *exactly*, single words will rise towards or fall back from the eye, and thus, as we before pointed out, by varying the spaces between the words even in the slightest degree, a marked effect is produced. Speaking of these phenomena, a correspondent of *Silliman's Journal* (E. M. Blake) has suggested that in this age of advertising it might be worth the while of enterprising individuals to print their advertisements in a stereoscopic form. It would certainly gain for them a more general and careful study than this class of literature can generally command. The journal in question is illustrated with a stereoscopic advertisement of itself in order to illustrate the suggestion, each half being in the form of a square with lines along the four sides; inside these are other lines forming a series of squares, getting smaller and smaller towards the centre. The distances between the lines is so arranged by skilful *spacing* that when the stereoscope is placed over the page containing this advertisement it appears as if the beholder were looking into the base of a hollow pyramid, with the lines arranged round the interior surface and retreating back into the distant apex. The illusion of distance is heightened by the employment of smaller sizes of type for each inner square. The whole has a very striking and novel appearance, and we doubt not will fully answer the end proposed by the suggestor. It would be quite a new feature in advertising for the wrappers of our journals to be thus ornamented with stereoscopic advertisements, or to have insinuated into our hands as we walk along the streets, tastefully got up stereoscope slides, eulogising the virtues of the last new collodion. The novelty of the idea would certainly tempt us to inspect it in the stereoscope, and since all that advertisers say they want is for their wares to be brought prominently before the eyes of the public, it would be their own fault (or that of the unhappy compositor to whom the "spacing" was entrusted) if the desired end was not then gained.

A few months ago we drew attention to some researches which had been made by Bunsen respecting the employment of magnesium as a source of light. Professor A. Schmitt has recently published some further suggestions on this subject. From the researches of the first-named chemist it is known that when magnesium is ignited it readily takes fire and burns with an exceedingly brilliant flame. The intensity of the light so produced, as determined by Bunsen and Roscoe, in one of their photochemical researches, is only some 525 times less than that of the sun. Compared with an ordinary candle it appeared that a wire of magnesium 0·0117 inch in diameter produced as much light in burning as 74 stearine candles, five to the pound. In order to support this light during one minute a piece of wire 39 inches long, weighing 1·85 grains, was required. Only 2¼ ounces of magnesium, therefore, would be required in order to maintain during ten hours an amount of light equal to that of 74 stearine candles, consuming about 320 ounces of stearine. Magnesium wire is readily obtained by forcibly pressing the metal through a hot steel die by means of a steel piston. Bunsen's arrangement for burning the wire was made by connecting spools of it with rollers moved by clockwork, so that the wire should be unrolled like the ribbon of paper in Morse's telegraph; the end of the wire thus gradually pushed forward passed into the flame of an ordinary alcohol lamp where it took fire. It is evident that a magnesium lamp of this sort must be much simpler and more compendious than any of the existing arrangements of the electrical or of Drummond's light, for lighthouses, &c. Where an intensely brilliant illumination is required it can hardly fail to rival either of these. Where an extraordinary amount of light is needed it could readily be produced by burning large wires, or several thin ones at the same time. Another important consideration is the fact that the spools of wire as well as the clockwork and spirit lamp are easily transportable. It is not, however, to the intensity alone of the magnesium flame, that these lamps owe their utility, for the photographical effect of the light is also very great. According to Bunsen the photo-chemical power of the sun is only 36·6 times greater than that of the magnesium flame. The latter must therefore be useful in photographing by night or in any dark or subterranean locality; the evenness and remarkable tranquillity of the flame especially commending it for this purpose. The present high price of magnesium, it is true, must prevent any extensive use of it for technical purposes. For example, Lenoir of Vienna charges six shillings sterling for a gramme of it (1 gramme = 15·4 grains), hence the cost per minute of the light just described would be 1s. 2d., and the cost during ten hours would amount to £22 sterling, while 320 ounces of stearine could be procured for less than 28s. But even at this price it could still be used by photographers, since it would only be required for exceedingly short intervals of time, and all unnecessary consumption of the wire might be prevented by stopping the clockwork. Of course the price here mentioned must be regarded somewhat as a fancy price owing to the fact that magnesium is not yet applied to any useful purposes in the arts, and consequently is only met with, as aluminium was some years ago, as a scientific rarity. If any demand were to arise for this metal, and it were to be manufactured on the large scale, we have no doubt that it could be produced for a few shillings per ounce, and in that case the 2¼ ounces of magnesium which would be required to keep up the light for ten hours need not cost more than ten shillings, and no one could complain of having to pay a shilling per hour, for so intense, portable, and harmless a light.

A specification has been registered by M. P. A. A. Bean for an instrument which he calls a neomoscope, or apparatus for viewing photographic or other similar pictures. The

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in hot or warm water, and we have heard of photographers who have first poured the gold solution in the hot water, and afterwards have added the phosphate of soda. The gold was in consequence decomposed, and the solution rendered turbid and unfit for use.

invention consists of a pyramidal or conical-shaped case, with a part of one of the sides removed to admit light, fitted with a flap or not, as desired. The lens, or lenses, are fitted in the top of the apparatus, and in some cases flaps for forming, when raised, a dark chamber round the eye and the glass are added. The bottom of the apparatus is made to slide, to admit of its being entirely removed in order to view transparent objects, or others, apart from the apparatus itself. The sides of the apparatus are either made rigid or to fold. The inventor sometimes adds a pocket, which forms part of the sides or bottom of the apparatus, to contain photographic or other representations.

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 31*st October*, 1860.

With the return of long winter evenings we may look for the resumption of those delightful scientific *réunions* which make a residence in cities so pleasant and profitable. The meetings of our Photographic Society are now resumed, and in my next I will remit you an account of the most important matters introduced. Permanent positive printing: enlarged positives on paper, by the aid of an adaptation of the solar camera, are among the subjects that have most engaged our attention during the recess, and we may not unreasonably look forward to the exhibition of various improvements in those features of our art. Photography by steam we have heard of, but not yet seen, and may therefore be permitted to doubt until the fact is substantially brought before our eyes. There are many wonderful things it is true, which, unseen, draw largely upon our credulity, but printing some 12,000 stereographs per hour *must* be seen to be believed. It not unfrequently happens that a suggestion or supposition is announced as a *fait accompli*, and may it not be so with the wizard of Cincinnati, Mr. Charles Fontaine?

The rectification of sulphuric acid offers an example of how readily even the most practical matters may fall into oblivion in spite of the copiousness and vigilance of our literature. Fifteen years ago Professor Siller, then Professor of Pharmacy at Donpat, called attention to an exceedingly ingenious device for rectifying sulphuric acid. The retort in which the rectification of the acid is to be conducted, should be placed upon a bed of ashes about an inch in thickness, and sand then heaped up all round it; the distillation may then be proceeded with without any further precautions. By this method I have twice rectified sulphuric acid, operating with a very bad retort upon portions of fifteen pounds weight, and have been astonished at the facility and tranquillity with which the distillation proceeded. The ashes evidently act as a non-conductor, so that the acid can boil only from the sides of the retort. Other expedients have been proposed, all depending upon some peculiar apparatus constructed for this particular purpose, but I have not yet met with any reference to the simple contrivance here mentioned. Perhaps, however, it would be more convenient to fill a sufficiently capacious crucible with ashes, or some other non-conducting substance—calcined gypsum, for instance,—as a bed upon which to rest the bottom of the retort. A charcoal fire being then built around it.

Caoutchouc may be vulcanized by means of mixed sulphur and hypochlorite of lime. When flowers of sulphur and bleaching powder (hypochlorite of lime), are shaken together, a very strong odour of chloride of sulphur is immediately developed. If the mixture be somewhat forcibly rubbed in a mortar, elevation of temperature ensues, the sulphur softens, and the mixture becomes solid, while abundant vapours are evolved. When a much larger amount of sulphur than of the hypochlorite is used, and friction is avoided when the two are blended, a mixture is obtained, which being added to the caoutchouc paste—either with or without the addition of inert matters, such as chalk, oxide of zinc, &c., serving to give "body" to the product—effects the vulcanization of the latter either at the ordinary temperature, or when gently heated. By this means objects of any thickness can be uniformly vulcanized.

If, instead of employing an excess of sulphur, an excess of hypochlorite be introduced into the mixture, and this be agitated, so much heat will be developed that the vessel containing the mixture can no longer be held in the hands; if the flask be closed the action becomes so violent that the cork will be blown out, or the flask broken by a violent explosion.

Cadmium promotes the fusibility of some metals, as tin, copper, lead, and bismuth, while it does not promote the fusibility of others, as silver, antimony, &c., that is, it does not lower the melting point beyond the mean. Its alloy with lead and tin in any proportion, and with silver and mercury within a certain limit, say equal parts, and especially if two parts of silver and one of cadmium, or two parts of cadmium and one of mercury are used—are tenacious and malleable, while its alloys with some *malleable* metals—gold, copper, platinum, &c., and probably with all brittle metals, *are* "brittle."

There is a great discrepancy among authors as to the melting point of this metal. It is usually stated to be the same as that of tin (442° F. Brunde). Daniell gives its melting point at 360° F., while others place it at 550° F. (Onermaun), which is doubtless nearest the truth. It volatilizes at about 600°. It takes less cadmium to reduce the melting point of another metal than it does bismuth, besides, the cadmium does not impair the tenacity and malleability of the alloy, but increases its hardness and general strength.

Some very interesting experiments have recently been made on the cementation of iron. The processes employed in the arts vary as to the composition of the cements, but they all agree as to the manner of operating. The piece of iron to be cemented is placed in an iron box and surrounded either with powdered charcoal, or tallow, carbonized leather or horn. Each method is extolled by those who practise it, but the explanation of the fact itself has hitherto remained unknown. M. Caron, in seeking an explanation of the phenomenon, thought that the combination of the iron with the carbon could take place only by the medium of a gaseous carburetted compound, which penetrating the pores of the metal dilated by heat gave up its carbon. But from the nature of the cements employed, it appeared that this compound should be a cyanide. To be satisfied on this head he surrounded a bar of iron in a porcelain tube with fragments of charcoal, and placed it in a reverberatory furnace, heated with coke to redness. Hydrogen, carbonic oxide, nitrogen, atmospheric air, pure carburetted hydrogen, &c., were successively passed through the tube. After two hours firing with each, no cementation, was obtained. A very few places on the surface of the iron were become a little harder, but in every case the cementation, always superficial, could be attributed to the impurity of the carbon or of the gas.

But when dry ammonia gas was passed through the tube the cementation was rapid and good; after two hours heating the bar of iron was fully tempered, then hammered to improve the grain and tempered anew; when the bar was broken a cementation of $\frac{3}{100}$ths of an inch was determined, perfectly regular, and of a splendid grain. M. Caron attributed the cementation to the action of the ammonia upon the carbon. He thought that at a high temperature these two bodies formed a gaseous cyanide of ammonium, which cedes its carbon to the iron and converts it into steel. But as this was only an hypothesis, he wished to trace the direct action of the cyanide of ammonium; so, in the next experiment, he suppressed the carbon, exposing the bar of iron to a current of gaseous cyanide of ammonium. Ammoniacal gas or rather cyanide of ammonium, it was thought was not the only substance that enjoys the property of inducing cementation, but probably other alkaline cyanides possess it also. Tempering with prussiate of potash, so well known in the arts, is a proof of it, but unfortunately in this case of cementation, it is only superficial. and cannot be compared with the other. Other means of cementation by the alkaline cyanides remained to be tried. Cyanide of potassium gave an excellent cementation after an exposure of the bar of iron to its influence. The cyanides of soda, barytes, and strontium gave similar results.

All the various recipes, some of which are very complex, adopted in the arts for cementing iron, are explained by the formation of cyanides.

M. Fremy's experiments tend to prove that steel, which has been regarded as a carbide of iron are, in fact, combinations of that metal with a complex radical, which may be compared with cyanogen, and which, like it, is produced by the direct combination of carbon with the nitrogen of the atmosphere. For when steel is acted upon by an acid, the black residue resulting which has hitherto been considered as graphite only, is in reality, a mixture of graphite with a brown matter, the complex radical of M. Fremy. His experiments also show that carbon may be replaced in its combination with this radical by sulphur, silicium, phosphorus, and arsenic.

But the whole of this very important question has been practically resolved by M. Cazenave, of Belgium. Fully agreeing with the theoretical views of M. Carron, he made an experiment which tends to nothing less than changing the theory of cementation, which consists, as is well known, in removing the carbon from the cast-iron, and in adding it to the pure iron to convert it into steel. It now appears certain that it is nitrogen which plays the essential part in these two operations, and with such rapidity that the work of days is accomplished in hours, to effect the change, which can be regulated at will, in "steeling," for example, the tires of wheels, the surface of rails, the exterior of tubes, leaving the interior of soft fibrous iron. By this process the pig-iron is at once converted into steel almost instantaneously, and as deep as may be required in a few hours.

A new fact in the history of aluminium consists in its now being reduced, in the hands of the gold-beater, into leaves as thin as those of silver and gold. Aluminium in powder, as fine as those of the precious metals is also manufactured. These results have been arrived at only with very great difficulty. The annealing of the aluminium must be frequently repeated, and cannot be performed in the ordinary manner as with silver and gold. Otherwise, the operation of beating is conducted in the usual manner. Aluminium leaf will replace silver leaf, it is not quite so brilliant, but it is not so readily tarnished.

A metallic paper is produced by causing very thin tin-foil to adhere to sheets of paper. This material admits of many useful applications: it is superior to pure tin as a *hydrofuge*, applied to damp walls, preventing the exudations of saltpetre, and all kinds of deleterious emanations. Applied to the backs of paintings it protects them against the damp of the wall, &c., &c.

The exudation of gum from certain trees, such as the plum, cherry, almond, apricot, &c., is the result of disease, arising from various causes, all of which have the effect of accumulating too great a quantity of sap at one point. It arises rom excessive nutrition of the new tissues. When these receive too much juice, the young cells of the generative layer, chiefly in the places where, apparently, the vessels ought to be formed, are reabsorbed. The result is, hollows full of liquid, which mingles with the contents of the dissolved cells, the incompletely liquified membranes, and entire cells detached from the disintegrated portion of these accidental cavities; these, at first very small, quickly enlarge by the reabsorption of the surrounding utricula. These latter, before disappearing sometimes enlarge greatly, and even divide transversely into several cells, after becoming elongated.

When, on the contrary, the most external generative cells are not destroyed, they continue multiplying, leaving behind them a zone of hollows more or less extensive. But if, after the birth of a ligneous zone or the exterior of the zone of hollows, the excessive nutrition be repeated in consequence of fresh rains, for example, reabsorption still follows, engendering hollows, which may be followed by the same accidents, either the death of the generative layer, or new ligneous products on the exterior. Such is the origin of the gum disease. Up to this point no trace of this substance has appeared. The latter, even, is rarely if ever perceived in the hollows surrounded by very young tissue Usually, it is only a very long time after the reabsortion, that the gum begins to manifest itself. It makes its first appearance about these hollows, under the form of a colourless product, often of a gelatinous appearance, which gradually fills the hollows, where it becomes coloured yellow or brown.

If these hollows filled with gum are near the bark or if the ligneous layer covering them is still very young, or offers little resistance, the gum secreted breaks it, penetrates the bark, passes through it and arrives outside.

The internal bark, by nature of its tissue, is easily traversed. It increases much more rapidly than the external bark, sometimes dividing itself, following the medullary rays in plates which turn and fold up, leaving between them spaces more or less considerable which become occupied with the gum.

The lesions described are not limited to the alterations produced by the gum-disease. The presence of this substance in bark sustains a constant humidity, and is very pernicious. In fact, a fermentation is established, the liquids acidify, and powerfully concur to the destruction of the tissues in which they spread.

The Hot-Water Process.

Sir,—Permit me a space in your columns, in order to draw your attention to a paper recently read by Mr. Parry before the Manchester Photographic Society; and in doing so, it will be necessary to bring before your notice a series of experiments commenced between two and three years ago.

While making some experiments with albumen as a preservative, I found that if all free nitrate was washed from the collodion film, it so far retarded the action of the plate that I could scarcely get a picture with half an hour's exposure. The thought then struck me that this was due to the altered structure of the film, and not to chemical action; and that if the plate was redipped in the nitrate bath to coagulate the albumen, I should restore its sensitiveness; this I did, and found great sensitiveness and uniformity of action the result.—(See *Liverpool and Manchester Journal*, July 15, 1858.)

Still carrying out my experiments I thought, if correct in my theory, I should succeed by making use of collodion iodized with iodide of cadmium, as the free nitrate of that metal left in the film would be sufficient to coagulate the albumen without any further process; and so great was the sensitiveness that I took a portrait of my son in a few seconds; but there is this drawback, that the film blisters all over when the metallic iodides are used.

Still believing my theory correct, although strongly opposed by the chairman of the North London Society, who maintained that a chemical, not a structural change, was the cause of sensitiveness, another thought crossed my mind, that the most simple means of coagulating the albumen would be the best. Therefore, after taking my plate from the bath, and washing it from all trace of free nitrate, and then coating it with albumen, I plunged it in a bath of water just below the boiling point for a few seconds; and when dry I got a negative in less than thirty seconds with a Ross' stereoscopic view lens.—(See Photographic News, Oct. 29, 1858.)

Now, sir, you will not wonder at my surprise in finding my process, announced in 1858, described by Mr. Parry as something new in 1860.

In conclusion, I may remark, that I shall endeavour shortly to lay before your readers details of some recent interesting experiments as to the best mode of producing the required structural changes. Jno. Ryley, M.D.

Islington, Oct. 30th, 1860.

[The independent discovery and rediscovery by different persons, of similar processes, have frequently occurred in the history of photography. We have no doubt whatever, and we presume Dr. Ryley has none, that the experiments of Mr. Parry were conducted without any knowledge of those of Dr. Ryley; nevertheless, we are happy to afford him this opportunity of stating the case. If we remember rightly, some difficulty in obtaining clean pictures was stated to be an obstacle in the first experiments of Dr. Ryley. We shall be glad to receive his further experiments.—Ed.]

Northampton, Oct. 26, 1860.

Sir,—In your report of the proceedings of the Manchester Photographic Society, in your impression of the 12th instant, you give an abstract of a paper by Mr. Parry on the collodion albumen process, in which, after sensitizing and washing the plate, it is covered with plain albumen, and, before being dried, is plunged into water sufficiently hot to coagulate the albumen, when it is ready for exposure, and yields excellent results.

Surely there must be some error in your report; for, at first glance, it seems impossible that the heat employed should not hasten a decomposition of the combined free nitrate still left in the molecules of the collodion with the albumen, which naturally contains some of the chlorides blended with animal matter. Have any of your numerous readers tried this process, and found the result satisfactory?

I must own to being sceptical on the subject, from being unable at all to imagine how total failure can be avoided with any experiment performed as suggested in the report to which I allude. If I am guilty of contempt prior to individual examination, for which I cannot afford the time, and there is *anything* at all in the discovery, I think it will prove one very prolific of improvements to some of our dry processes.

I merely offer these inquiries in the hope of getting the subject well ventilated by able and exact experimentalists. —Yours very truly, W. L.

[We insert our correspondent's letter to aid the "ventilation" of the subject. But surely it should have occurred to him that one fact was worth any amount of theory. Mr. Parry described what he had *done*, and its success; not what he "imagined." Moreover, as our correspondent will perceive, from the preceding letter, that the same facts have before been stated. He seems to forget that after the combination there is no longer free nitrate and albumen, but a new compound, which, notwithstanding the hesitation on the subject expressed by some, must be called, we suppose, albuminate of silver.—Ed.]

Photographic Notes and Queries.

Albumenized Paper Transparencies.

Shooters Hill, October 24th, 1860.

Dear Sir,—In sensitizing some albumenized paper a few days since, I accidentally got some nitrate of silver on the back of the paper; these parts in printing came out much more intense, and, moreover, the action seemed to penetrate the paper, producing rather an intense picture on the back; also, on looking at it by transmitted light, it made a beautifully clear transparency. Might this not be made available for printing transparencies on albumenized paper, and if the paper was afterwards waxed, would produce, I have no doubt, very beautiful results, and besides which the wax would preserve the permanency of the prints and be subject to no decomposition, even in damp situations.—Yours, very faithfully,

Thomas Clarke.

[It is a fact well known to most photographic printers that to get brilliant prints the silver should be kept on the surface of the paper; and that if it permeate the paper, the prints, although vigorous by transmitted light, are unsatisfactory by reflected light. The texture of paper is unfortunately a great drawback to its use for transparencies even when waxed. —Ed.]

Saving Collodion Films.

Axminster, October 30th, 1860.

Sir,—Observing in your answers to correspondents, in the last number of the News that in reply to "Oxy," you state that you do not think that saving old collodion films, would repay the trouble, &c. Allow us to state that we have saved such films for more than three years past, and find it to be *no* trouble, and pays very well. Every failure (negative or positive) we wash off into a dish we keep for the purpose, and old pictures we throw into the same dish to soak, and then wash off; the water may either be plain or contain a little carbonate of soda (this latter, however, will not do if the water contains much lime), the result of these washings we throw into the filter with the chloride of silver from paper positive washings, &c., and have never had any explosion or danger of one; indeed, we have experimented on the combustibility of the dried films, and have found some to burn scarcely at all, some to burn rapidly and with scintillations, like the paper saturated with a nitrate; but we have found very rare instances of its being at all explosive, and then certainly not to such an extent as to be unsafe when burnt with other photographic waste.—We are, sir, yours respectfully, H. & J. Walter.

[Our answer referred to the films in old *dried* plates. If the films are removed from the glass whilst wet there is very little trouble and some saving.—Ed.]

Gas Bags.

Irving Street, Birmingham.

Dear Sir,—Perhaps the following will serve the purpose of your correspondent:—Dissolve india-rubber in bi-sulphate of carbon in a cold state in a bottle. It will dissolve in a few minutes. This applied to cloth, leather, or paper on the two laps and a warm iron passed over a time or two, will cause them to adhere so that nothing will part them again. I have put a patch on my boot with this paste, shaving the leather to a feather edge, and the joint has been so perfect that a wager has been made that there was not a patch on the boot.

Charles Eades, *Chemist.*

Various Photographic Difficulties.

Blandè quæritur:

1.—A proof on albumenized paper having been three or four times washed, toned (alkaline gold toning) and rapidly washed, is then placed in the hypo-fixing bath for 10 or 15 minutes. A dark precipitate is *sometimes* thrown down in the hypo-bath—not always; on other occasions the hypo remains unclouded.—Why?

2.—In developing a collodion negative with a one-grain of pyrogallic solution, wherever the developer is poured on, the negative is greatly enfeebled by lighter markings than the rest of the surface.

What is the chemical change or derangement produced in these parts?—Why? and how can it be avoided?

3.—A reversed action of light is sometimes observed in a collodion negative, *e.g.*, the shaded folds of a black-cloth coat will become of a deeper black so as to print white in the proof; and sometimes a border of light will be found (in the proof) surrounding the edges of a dark object.

Perhaps this is an indication that the negative has been over exposed. But as to this remarkable result.—Why?

4.—Kaolin is recommended in preference to animal charcoal to decolorize the nitrate bath used in sensitizing albumenized paper; but be it filtered ever so slowly (*guttatim*) some of the kaolin passes the filter, and the solution is anything but clear. —Why?

5.—With all care in the toning and fixing to avoid air bubbles (keeping the proofs moving frequently during the operations), *yellow spots* very frequently make their appearance in the finished proof—usually in the sky. Proof after proof is thus spoiled.—Why? and how avoidable?

6.—Sometimes a good negative is unfortunately broken after a proof has been obtained from it. The attempt to obtain a a fresh negative *from the positive* (not by superposition, but by the camera) is always attended (at least in the enquirers hands) by myriads of minute specks on the new negative (most visible where most transparent); one might imagine Puck had shaken a tiny pepper-box over it!—Why? and how to be avoided?

7.—The enquirer has for many years sensitized albumenized paper with success, using a nitrate of silver solution of 60 to 90 grains per ounce. Lately, say for a year or so, using the same formulæ and manipulation, he meets with continual annoyance.

The papers, when pinned up to drain, are no longer clear and clean, but covered with dirty striæ and large comets, occasioned by small air bubbles, evolved from the substance of the paper (not through carelessness suffered to form on the sensitizing bath).

The sensitizing bath is also far more rapidly discoloured than aforetime, and acquires a degree of glutinosity, so that bubbles formed on it are difficult to break, and so tenacious that they are very unwilling to be swept into an out-of-the-way corner. This thickening of the bath has doubtless to do with the aforementioned striæ; and also in making the papers much longer in drying than formerly.

The enquirer is inclined to attribute this to faultiness in the paper.—Is it so? why and how corrected?

All the enquirer's operations are and have been conducted in a room perfectly free from photogenic rays. This albumenized paper has been purchased from —— [1], —— [2] and —— [3], and hitherto No. 1 seems best; but many (perhaps *most*) sheets are injured (apparently *purposely*) by zigzag lines, as if done with a wooden style. This may be good for trade, but it is a sad annoyance to a photographer.

[Our courteous questioner has furnished us with material for a volume if treated at large: we will endeavour briefly to answer him.

1.—The precipitate will not be thrown down if the hypo be fresh and alkaline or neutral.

2.—The negative is enfeebled at the point where the developer is poured on, only if it be done somewhat forcibly and in one place. It is the result of *mechanical*, not *chemical*, action: the film of iodide of silver in such case, being only on the surface, is removed by the force of the stream; and may be avoided by pouring on the developer more gently, and with a motion which spreads it instead of allowing it to fall entirely on one spot.

3.—The deposit on the shadows is most common in hot weather, and is due to various causes. Some conditions of bath will cause it; diffused light in the room whilst developing will cause it; too free use of silver in the developer, and prolonged development, will cause it, especially if there be insufficient acid in the solution. The best method of avoiding it is to avoid continuing to use the developer when it shows a tendency to become muddy; wash the plate, and use fresh developer, with a little silver, at once. Citric acid in the developer is a good remedy.

4.—A double thickness of filtering paper, and filtering twice will prevent this.

5.—These yellow spots are undissolved hyposulphite of silver, the consequence of imperfect fixation. The first action of hyposulphite of soda on chloride of silver is to convert it into hyposulphite of silver; and hyposulphite of silver is only soluble in a *strong* solution of hyposulphite of soda. If the fixing bath be weak or old the hyposulphite of silver is not entirely dissolved, but appears in yellow spots, which gradually decompose and get darker. It is avoided by using the hypo-bath new and strong enough, and taking care that each print is immersed long enough and thoroughly.

6.—There is no sufficient reason why this should be the case if the work be carefully done. We never met with it, except from clearly traceable causes. It can have nothing to do, that we see, with the fact of copying from the positive, unless you refer to the appearance of texture due to the surface of the print from which you copy.

7.—We believe that in the preparation of much of the albumenized paper in the market other substances, such as gelatine, &c., are added to the albumen, and that many of these annoyances are traceable to that cause. That being the case it is difficult to suggest any other remedy than the use of another sample of paper.—Ed.]

Glazed Surface of Paper Prints.

Worthing, Wednesday.

Sir,—Would you please to inform me in your next number of Photographic News how that beautiful polished, *card-like* gloss is done on stereoscopic and *visiting* card portraits.

I use albumenized paper, but cannot get so smooth a surface. Your reply will oblige. H. Goble.

[There are several modes of giving "surface" to photographs; simply "rolling" or hot-pressing them is a great improvement. Some persons varnish them, and others cover them with gelatine in the manner of varnish. There is an "encaustic paste" prepared for the same purpose. An excellent plan for getting a very beautiful surface is given at page 168 of our first volume. Perhaps one of the best methods is that given by our German correspondent in No. 108.—Ed.]

Proceedings of Societies.

North London Photographic Association.

The usual monthly meeting of this Society was held on the evening of the 31st ult., George Shadbolt, Esq., in the chair.

The Secretary read the minutes of the previous meeting, which were passed.

Mr. George White was proposed as a member and duly elected by ballot.

Mr. D. W. Hill, Treasurer of the Association, then read a Paper, entitled "A Photographer's Holiday in Derbyshire."

Believing, as it had been more than once remarked, that a detail of the failures, successes, and experiences generally, of a photographer of average ability might afford material for profitable discussion, he had been induced to give a brief statement of his photographic experiences in a recent tour in search of health and recreation in Derbyshire.

He started on the 5th of July, taking with him his stereoscopic apparatus, and Burfield and Rouch's dark box, with a good supply of chemicals for the wet process. In order not to lose any time he commenced operations the next morning after his arrival; and as he had not previously used the dark box, he had to familiarise himself with the method of working in it. The weather being warm he found much difficulty in developing Ponting's collodion, as he could not cover the plates evenly before the action commenced, although he increased the amount of acid. But Bolton's collodion he found worked admirably; it developed slowly, evenly, and without fogging. In cold weather he preferred Ponting's, or a mixture of that with Bolton's. He found the dust very troublesome, and was obliged to keep the inside of the box damp. After the first day's experience he rarely failed in getting clean negatives; and he could strongly recommend those who very naturally object to being suffocated in a tent to try one of the boxes he had used. Matlock and its neighbourhood contained within a small compass more good subjects for the camera, he remarked, than any place with which he was acquainted; it was impossible to go a dozen yards without seeing something worth taking.

After describing many places and views of which he had secured negatives, he remarked, that from the unusual curiosity shown by the people at Bonsall, he thought it had not often been visited by a photographer. He was quite mobbed, and prevented from taking many pretty spots he had selected. He succeeded, however, in securing the old Market Cross, a pillar, dated 1678, resting on a base formed of ten steps. When the children saw what he was about, they crowded up the steps, and he made an attempt to take them in that position, but just as he had uncovered the lenses, an unfortunate rat running across the road caused the whole of them to start in pursuit. While he was occupied in taking cross, a lad, who accompanied him to assist in carrying his apparatus, amused himself by inducing some of the boys to dip their fingers in the waste developing solution and then rub them on their noses, which, under the influence of the light, soon assumed a pie-bald appearance, decidedly more comical than elegant, and no doubt astonishing to their affectionate relatives, for he imagined they were puzzled to get the stains off. On another occasion, as he was fixing a plate, his factotum informed some people he was "taking the scum off," fancying, of course, that in his "distinguished" position, it would not do to appear ignorant of the object of any of the operations. Having become tolerably accustomed to his box, we one morning took the train to Rowsley, and from thence proceeded to Haddon Hall, which is considered one of the finest and most perfect specimens of an ancient baronial mansion in existence, and forms a marked contrast to Chatsworth, which represented the modern style. Having secured six or seven negatives, he made way for a gentleman who had a small cistern about four feet square, mounted on wheels, for a dark room. He also was taking stereoscopic pictures. At Chatsworth, the magnificence of which he would not attempt to describe, a thick fog was an effectual barrier to photographic operations. On the occasion of his last trip, which was to Wingfield Manor, the rain poured in torrents. This was not exactly what he wanted; but having come a long distance, and it not being likely he would have another opportunity, he determined not to go away without some reminiscence of the place. So he borrowed a tarpaulin from the farmer who resided there, to cover his box, set to work, and succeeded in taking seven negatives, the exposure varying from four to six minutes. Had the weather been more favourable, he could have taken a large number; as it was he was limited to near objects. He usually took with him two three-ounce bottles of collodion, six ounces developer, four ounces cyanide solution, a gutta-percha bottle holding a quart of water, a smaller one for rinsing the plate before fixing, two pneumatic holders, one dozen plates in light box with wide grooves, and gutta-percha bath, which was very annoying by the covers sticking and having to be torn off. He used up three of them. He had a fluted-glass dipper, which he liked very much, as the plate could not slip off.

At the conclusion of the paper Mr. Hill handed round several excellent stereo views of the scenes he had visited; a remarkable circumstance in connection with the subject being the fact, that some of those taken during very heavy rains were amongst the finest shown.

After some conversation—

The Chairman remarked that an interesting question for discussion was suggested by the paper as to the best apparatus for field use with wet collodion. Portable boxes were preferred by some, tents by others, and the use of the camera itself for operating within, as in the case of Archer's camera by others. There was one point, he thought, generally forgotten by those who recommended the latter plan, which materially affected the convenience of the photographer. It rarely happened that he put the camera down in the first instance just at the spot from which he wished to take his view, and when the camera was used as dark box as well, it was a serious trouble moving it frequently to try the effect on the ground glass of different points of view before one was decided on.

Mr. Hill remarked that another difficulty was involved in the use of camera as an operating box. He had frequently planted his camera in the direct glare and heat of the sun, which he could not have done with any chance of success if the bath, developer, &c., had been inside. He placed his dark box, however, in the shade, where every thing was kept cool. This was important in another respect; he believed many plates were spoiled by the hands of the manipulator being very hot, which they could not fail to be if working in a dark box in the full heat of the sun.

A Member asked if Mr. Hill did not usually use dry plates.

Mr. Hill said that having started on his journey at a short notice, he had, on account of the bad weather, no dry plates prepared; so that he had really chosen the wet process on account of the wet season.

The Chairman: On the principle *similia similibus curantur* (laughter).

Mr. Dawson had tried Archer's camera five years ago, but found it inconvenient. He never could see, satisfactorily, the process of development through yellow glass—for his own part he preferred a tent, and the larger it was the better he liked it. The best he had seen was Smart's, as in it the the photographer might, without inconvenience, remain within long enough to develope a picture, say for five minutes, without coming out to breathe; which in small tents was impossible. In speaking of large tents, he did not think they need be necessarily heavy. He had seen some both large and light. In regard to the use of water, he thought that was not necessary inside the tent, not even to wash before fixing; as if strong hypo was used the usual washing before fixing might be dispensed with. Some gentlemen present might have seen the fine pictures of Mr. Ross of Edinburgh—these were taken in a tent of good size; but all the work inside the tent was done by a hunchbacked lad, Mr. Ross preferring to keep outside himself (laughter).

Mr. Hill said one advantage of Burfield and Rouch's dark box was the freedom which the photographer enjoyed from the effect of the chemicals. He was not in good health, and could not well bear to work even in his own dark room; but here he suffered no inconvenience at all. He found no difficulty in seeing to develop through the yellow glass; but he had the window in the box made double the usual size.

Mr. Dawson had another objection to Archer's camera there was perpetual danger of spoiling the nitrate by drops of developing solution, &c., falling into it.

Mr. Hill said the only difficulty he had experienced was the want of a firm, portable stand for the box. He had used the ordinary tripod stand; but he thought a better support might be made by four rods, one for each corner, these should go up the sides of the box, as sufficient firmness would be attained if the box merely rested on them at the corners.

Mr. Maltwood then exhibited a portable dark box of a very ingenious and convenient character. One of its chief points was the use of a portable cistern, consisting of an india-rubber cloth bag, holding about a gallon of water, which lay on the top of the box, having a pipe, with a tap attached, communicating with the inside of box. It afforded better facilities than usual for watching the progress of development, having a yellow glass window at each end by means of which light sufficient fell on the plate for the manipulator to see it perfectly through another yellow window at the top. Another point of convenience was the possession of a suspended shelf, hanging by straps about a foot below the box. It contained camera and everything for working stereoscopic pictures in the field; and weighed, when packed up, about twenty pounds. We hope to give a detailed description in our next.

A conversation on this tent followed, in the course of which reference was made to the inconvenience Mr. Hill had experienced from the tops of his gutta-percha bath sticking, and requiring tearing off. A member asked if the vulcanized india-rubber would have the same objection?

Mr. G. Wharton Simpson remarked that vulcanized india-rubber would not stick, but would be objectionable on account of the particles of sulphur which would enter the bath. Common india-rubber, which was free from this objection, sometimes became sticky in very hot weather; but if the vulcanized india-rubber were covered on the side next the bath with a thin sheet of gutta-percha, all the elasticity, necessary for water-tight tops, of the former was gained, with the cleanliness and freedom from sulphur of the latter.

Mr. Hill, had obtained from Messrs. Burgess and Key, some black unvulcanized india-rubber, which answered every purpose. He asked Mr. Maltwood if the box would not be lighter and quite as efficient if made of deal instead of mahogany.

Mr. Maltwood said that if it were made of deal it would need to be thicker, and thus nothing would be saved.

The Chairman remarked that the quantity of wood was so small that nothing would be gained in using deal if it were made equally strong. The chief weight was in the contents, not in the box itself.

Mr. Maltwood remarked that knapsack mode of carrying it made the weight comparatively easy. He was not a strong man; but he could, without difficulty, carry his box knapsack fashion for five miles.

The Chairman then called attention to very large composition picture, by Mr. Robinson, of Leamington, called "The Holiday in the Woods," remarking it was a specimen of what had been called "patchwork."

It would peahaps be unfair to enter into minute criticism of a work of this kind from the slight and cursory examination we were enabled to make at this meeting: possibly on some other occasion we may have more opportuntty of examining and describing it. We may remark, however, that at the first glance it is a striking looking picture, and appears to be well composed; the subject and general arrangement being good. It has some faults which Mr. Robinson can alter by glazing and throwing back by Mr. Rejlander's method of using the sun's pencil for that purpose. As it is, the figures appear too much on one plane, and the middle distance in some parts appears as bold and well-defined as the fore-ground. In some cases too the figures are bounded by the harsh outline produced by the scissors. We think Mr. Robinson can produce a better picture, with the same negatives, by judiciciously toning down and throwing back some parts of the picture. Comments on some of the faults to which we refer, were made in the meeting; but as a whole the picture was admired.

Mr. Hill showed a very fine specimen printed on a piece of the arrowroot paper he had received from Mr. G. W. Simpson at last meeting. It was universally regarded as possessing merit of a very high order, having the delicacy of albumen, without its offensive glaze. It was considered that if arrowroot paper, in all instances, gave equal results it would supersede all other papers for portraiture.

Mr. G. Wharton Simpson handed round for the inspection of the meeting a case of "Chromo Crystals" produced by Mr. Skaife's Pistol Camera. They consisted of portraits and street views, all instantaneous, and were much admired. He announced that Mr. Skaife would endeavour to attend the next meeting of the Society, and give some details of his process. Mr. Simpson also exhibited one of Meagher's Improved Portable Cameras. He stated that a similar form of camera had been produced by several makers, but this possessed an important claim to attention from the simple and inexpensive method of obtaining all the advantages of a swing back. (See No. 111 of the Photographic News.)

Mr. Hill remarked that a very convenient form of mount, for the lens to be used with a similar camera had been contrived by Mr. Morley which he hoped would be shown at a future meeting.

Mr. Simpson had seen the mount at Mr. Morley's. As it was attached to a camera focussing from the back, it needed no rack and pinion, but was rigid and scarcely projected beyond the front of the camera. Different lenses, he believed, could be used in the same mount, being dropped into a cell provided for them, and screwed up behind.

Mr. Hughes referred to a very portable mount for lenses, composed of several narrow tubes within each other, pulling out and extending like a telescope.

Mr. Morris Beck on the invitation of the Chairman, handed round for the inspection of the meeting some very fine stereo prints from negatives taken in Wales. They were produced by the collodio-albumen process, using Keene's collodion. He had nothing new to state regarding the process. He had found some difficulty in preventing the film leaving the plate, but had prevented that by applying varnish round the edge when he found the tendency. In some cases he used albumen to the edges, applying it with a camel's hair brush; in others he used copal varnish, both answered the purpose.

Mr. Shave had had the same difficulty, and found it generally happened when the collodion was rather thick.

Mr. Beck confirmed this view of the case, stating that it was always the thick edge that left the plate. He never had stains that were attributable to the process. His chief difficulty was a tendency to over intensity giving a snowy effect to the lights.

Mr. Shave remarked that this tendency was a general characteristic of the dry processes.

Mr. Hughes said he thought that this was a fault rather attributable to photographers themselves, than to the dry processes, the characteristic tendency of albumen being overlooked in their manipulations. Persons accustomed to the use of collodion negatives only, were always surprized when using negatives in which albumen was present, that such weak-looking negatives gave such brilliant prints. They were in the habit of taking collodion negatives as their standard, and overlooking the superior non-actinic character of the reduced deposit when albumen was present; they thus carried development too far, and only found it out when it was too late.

Mr. Beck remarked, that one advantage of the collodio-albumen process was the fact that it was hardly possible to over-expose. It was a good plan to expose for the deep shadows, and leave the lights to take care of themselves. In regard to the question of over-development, it was a good plan to stop short of what might appear sufficient, and then try a picture; if it was not sufficiently dense, it was then quite possible to develope further with gallic acid and silver. He would be glad to know if any gentleman had tried the effect of various proportions of water with the albumen.

The Chairman said he had tried every proportion, from pure albumen to one thirty-second part, and had come to the conclusion that if there was sufficient to combine with the free nitrate, all that was required was obtained, the weak proportion being equal to the strong, so far as intensity was concerned. The observation of Mr. Hughes on the subject of intensity was to the effect that the actinic rays could not pass through a much thinner-looking film of albumen than of collodion; hence it was evident that it was not the amount of organic matter present, but the colour of the reduced deposit, which affected the case; this colour when albumen was present was always of a red, yellow, or brown tint.

Mr. G. Wharton Simpson called the attention of the meeting to some very fine specimens of photolithography executed in Germany; the basis of the process being asphaltum dissolved in chloroform. They were regarded as the best specimen of the kind which have been seen.

After the usual votes of thanks the meeting separated.

Chorlton Photographic Association.

The meeting of this Society was held, on the 10th of October at the Chorlton Town Hall, Mr. William Griffiths presiding. After the usual routine business, and the examination of some specimens,

Mr. Sheard said, that with a view to prove the non-sensitiveness of a collodion plate coated with chloroided albumen, according to Messrs. Petschler's and Mann's formula, he had undertaken a number of experiments, the results of which he would lay before the meeting. He had prepared a plate in strict accordance with their directions, that is to say, he had coated a plate with ordinary iodized collodion, sensitized it in a slightly acid bath, washed it thoroughly under a tap for five minutes, then, after slightly draining, had coated it with albumen and water, equal parts, containing chloride of sodium, two grains to the ounce; he had then dried the plate by artificial heat, without exposing it to light. In this condition, the following day he exposed it fifteen minutes in a camera with a quarter-inch stop, six-inch focus landscape lens, and a medium light. After removal from the camera he poured over the plate the usual pyro developer, mixed with nitrate of silver. Chloride of silver was produced, which was seen floating in white curdy particles in the developer, and after a time a faint impression was visible. He then washed the plate, but only fixed one half of it in hypo. He had brought it with him for the inspection of the members. He had tried several others with like results. He thought that the alleged non-sensitiveness of these plates prior to the washing away of the chlorido albumen was not proved.

After some conversation on the subject, some negatives by Mr. Whipple's albumen process were shown by Mr. Archer, which had been produced with a very short exposure. Mr. Rogerson exhibited a fine print, 22 × 18, produced from a wax-paper negative, of a view in Wales, and a portable stereoscopic camera, which, with focussing glass and four double backs, weighed only two pounds and a half.

After some further conversation, and the usual votes of thanks, the meeting terminated.

Mechanics.

To make a simple Dark Slide.

The following is a description of a dark slide, for stereo dry plates, the construction of which is very simple; it is very light, and can be used with the stereo camera now generally in use.

Cut out of a sheet of cardboard, known as 10 sheet board, two frames, similar to fig. 1.

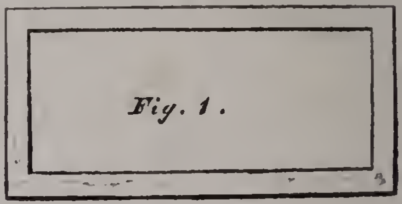


Fig. 1.

Another frame similar to fig. 2.

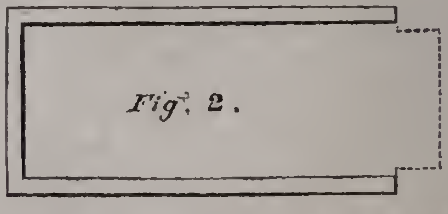


Fig. 2.

The sides of the latter should be a trifle narrower than the two former, and one end must be cut out. Glue these pieces firmly together. Fig. 2 being the centre, a groove will then be formed for the sliding shutter. The piece cut out from fig. 2 is to be preserved to form the sliding shutter, and if left a little longer at the end, as shown by the dotted line, it will form a holder to pull it out. Glue a piece of card on either side of this projecting end, the pieces so glued on serving as a stop to prevent it going in too far, and also give a firmer hold for moving it in and out. Similar pieces should be glued across the other end to prevent the slide coming quite out. Next construct a frame of mahogany, or other suitable wood (fig. 3.).

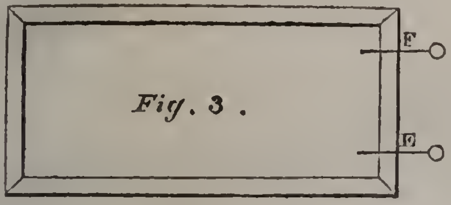
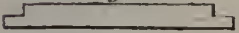


Fig. 3.

Fig. 6.

Fig. 4.



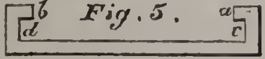


Fig. 5.

The wooden frame must be a trifle smaller in width than the card frame, so that the edge of the latter may project a little on either side, to allow of the corner pieces (fig. 6) being glued on for the plate to rest on, and also to allow a bead on the outer edge to slide into the camera. A back board of mahogany, rebatted at the edge as shown by the section (fig. 4), fits into the mahogany frame, two pins being inserted in the rebate corresponding with two holes in the frame; two more pins, E. F. (fig. 3) passing through the frame into the rebate at the other end, keeping it secure.

A focussing glass must be made in accordance with it, by having *four* thicknesses of cardboard, and fastening a piece of ground glass on it, enclosed with a frame or otherwise. The width of the cardboard frame will be regulated by the distance *c d*, and the mahogany frame by distance the *a b* (fig. 5) section of camera back. The best glue for the purpose is that known as marine glue. All the inside part should be coated with black varnish. W. H. I. G.

PHOTOGRAPHY AT SOUTH KENSINGTON MUSEUM.*

JOHN SCOTT, ESQ.; examination continued.

"883. *Chairman.*] What is the exact complaint that you make?—The charge that I make against the Department of Science and Art is this: they use the public money to crush the photographic profession; and that, in our exercise of that profession, they obstructed us, and tried to drive us out of the market.

"884. You say that they obstructed you; how did they obstruct you?—In the first place, they denied our right to photograph the cartoons, and we established our right. Having done that, they put obstructions in our way, which I proved by Mr. Austin's letter; and then, not having succeeded in either of those two things, they eventually allowed their photograher to publish the public property for his own benefit. Then an entire change comes over the whole system, and they announce the sale of Raffaelle by the yard, selling the photographs at eight inches for one penny. The consequence is, that all our arrangements for the photographing of those cartoons, upon which we spent a great deal of labour and money, and thought and anxiety, and everything which a man of business has to go through, are all thrown away Since the announcement that people can by these studies at 7*s.* came out, our speculation is entirely ruined. I am authorised by Mr. Roger Fenton to state, that since that establishment began, he, who was one of the first photographers in London, has abandoned the higher walks of the profession.

"885. Are these the charges which you bring against the Department; first, you say, they denied your right to photograph the cartoons, which you afterwards established?—Yes. The official correspondence would be with the Board of Works. I do not like to speak emphatically upon it, when I was not a party to the correspondence.

"886. Then your second point is, that they obstructed you?—Yes; and I proved that by Mr. Austin's letter.

"887. Your third point was, that they allowed their officer to publish those photographs for his own benefit?—I presumed so; that is my own impression; my proof that he used to sell them is in Mr. Thurston Thompson's bill, which I produced.

"888. Fourthly, you say that the prices were changed, and that they are now fixed at a rate so as to undersell you?—Yes.

"889. In the first place, have you access, as of right, to Government departments for the purpose of taking photographs?—I can only look to what has happened hitherto; permission has been allowed to photograph in the public galleries

"890. Invariably?—Under certain restrictions the public have a right to copy in those galleries.

"891. I am speaking of taking photographs, which is a different thing from merely copying in oil or water colours; the picture requires to be taken down as the cartoons did for instance?—At the British Museum access was allowed the photographer.

"892. The Cartoons at Hampton Court required to be taken down, did they not?—Yes.

"893. Has any photographer any right to go into a public institution, and take a photograph of any object in it?—Certainly not: it should be permitted, under certain regulations.

"894. Is it within your knowledge that permission has been given to private photographers to take photographs of such things, except in the cases you mention?—I should think so.

"895. Can you mention one?—It is very difficult to do so, because everybody photographs now-a-days, and very many photographs must have been so executed.

"896. You have mentioned the British Museum, and you have mentioned Hampton Court; can you mention any other?—We had permission to go to Buckingham Palace and to Windsor Castle to take photographs of pictures there.

"897. Did you have permission to photograph pictures at Buckingham Palace?—Yes, and to take them out into the private grounds of the palace. We, acting (by permission of Her Majesty), under the Lord Chamberlain's Department, have just produced a photograph work of the Gallery of the Old Masters at Buckingham Palace. Mr. Lake Price also has had permission to take photographs of pictures at Osborne House.

"898. I am not speaking of Her Majesty's private residences, but of public institutions; can you mention any instance except the two you have referred to?—Photographs have been taken at the National Gallery; we have permission now to go there, and we have been there and photographed. The British Museum has often been thrown open to photographers.

"899. Could you photograph them without having them taken down?—Yes, in certain lights.

"900. Sir *John Shelley.*] Is that permission allowed to other people?—Yes, I believe so.

"901. *Chairman.*] Any respectable photographer is allowed to take photographs of the pictures there, is he?—To the best of my belief.

"902. Mr. *Adderley.*] Do you know of cases?—No; but I have no doubt that other people have the permission.

"903. *Chairman.*] Who was the permission from?—I should suppose it would be from Sir Charles Eastlake, proceeding from the trustees.

"904. Mr. Wornum could not give the permission, could he?—I suppose not; unless he had latitude from the trustees.

"905. Can you mention any other case?—No; but I would prepare to mention a great many: for instance, Mr. Prout is now at work at the British Museum.

"906. Has the Department of Science and Art photographed anything except objects in public institutions, or in its own?—I do not know what the Department of Science and Art has done, but I know what Mr. Thurston Thompson has done. I was given to understand the other day that Mr. Thurston Thompson had executed a series of views at Albury, for the late Mr. Drummond, the Member for Surrey.

"907. Did the Department have anything to do with that?—He took the sappers and miners with him.

"908. He executed views for Mr. Drummond at Albury Park?—Yes; and he used the force of the Department for his own private purposes, selling the views for his own advantage, as I understand it; it did not concern me, and I did not take particular notice of it.

"909. Can you mention any other case in which Mr. Thompson has taken views except at Albury?—No, I cannot; and I only mention that as a piece of gossip.

"910. Mr. *Adderley.*] Supposing the trustees of the National Gallery were to photograph their own pictures, would you complain of their competing with private enterprise?—Most certainly; because my position is the same position as that which was taken by Messrs. Longman some years ago in regard to the publication of school books; the Committee of the Council on Education determined to produce books for the use of their schools, and they sent round notice to their schools that they were to take those books; and they also advertised such books through all the educational establishments in the country, at a nominal price; Messrs. Longman, the well-known publishers, who had invested a large sum of money in the production of school books, Pinnock's Catechisms, and so on, at once saw that this was a desperate blow at the commerce of the country; they entered into a correspondence with the Treasury upon the subject, and the result was that the Treasury rescinded their minute.

"911. Were not those books so published by the Department of Education books which anybody could publish?—Those books were books of a class upon the production of which Messrs. Longmans had sunk a large capital.

"912. Was not it in the case of the sale of books by the Government at a lower price which books might be sold anywhere?—Certainly not; I only mention Pinnock's Catechism as one of the Longman publications; the position the Government took was that such educational books should be published cheaply, for the promotion of education; and here is the South Kensington Museum now taking the same position with respect to photography.

"913. Do you complain that the Department of Science and Art should photograph for sale things which nobody else can get at?—I do not know that I have ever admitted that a public department could get at works of art to which a respectable professional man would be refused access.

"914. You do not complain of that?—I do not see the bearing of the question.

"915. Suppose the case of their being things which only the Department can get at?—I can suppose anything, but I do not understand how it bears upon the case upon which I gave evidence.

"916. Could the cartoons of Raffaelle at Hampton Court have been photographed by you without the permission of the Government?—Certainly not; but we had a prior permission to the Department.

(*To be continued*)

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* Continued from p. 293.

Talk in the Studio.

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Architectural Photographic Association.—The latest date for sending in pictures for the ensuing exhibition of the Association is the 15th of November, not the 5th as announced.

A Photograph of a Ghost.—An account of a phenomenon with which most practical photographers are familiar, has been seized on by the "spirit rappers" of New York as confirmatory of the truth of spiritual existence and presence in the material world. A photographer of New York, while engaged in some experiments, after cleaning a glass in the usual manner and covering it with the collodion film, took the picture of a chair standing in the room. On developing the picture, the image of the chair was seen perfectly portrayed, but miraculous to relate, portrayed with equal distinctness, a boy was seen sitting in the chair! An account of the circumstance, headed as above, was published in the *American Journal of Photography*, with a technical explanation, perfectly clear to photographers, but not so intelligible to ordinary people. At a recent meeting of the spiritualists in that city, the occurrence was described, and excited a great deal of interest, as affording the most direct and tangible proof that the departed do revisit the earth in bodily form. The office of the journal was visited to learn the particulars, and the question was asked in triumphant tones, whether science would attempt to explain away this evidence, also, as it has all the other evidence of that which is ignorantly and presumptuously calls the stupendous delusion of spiritualism. We suppose we hardly need inform or readers that the miracle is no more a miracle than is the taking of any photographic picture, or than any of the mysterious and wonderful operations of nature. The glass had been previously used to take a picture of the same chair with the boy sitting in it [illegible] had been so imperfectly cleaned that, in the developing process, the old picture came out with surprising distinctness.

American Portraits of the Prince.—The Prince of Wales visited the photographic establishment of Mr. Brady in New York, where he sat for a number of admirable portraits, alone and with his suite. They were taken at the request of the Historical Society, various members of which were desirous of possessing them as records of the royal visit. Mr. Brady is one of the oldest and most skilful American photographers.

South London Photographic Society.—This Society will meet in future at half-past seven precisely, the chair to be taken at eight—it being found that much time has hitherto been lost in the examination of specimens and apparatus, and in conversations thereupon, the regular business of the evening being thus considerably delayed.

Hint to Manufacturers.—A description will be found in the letter of our German correspondent in last No., of an application of photography to trade purposes. Hundreds of grosses of collodion positives, he states, are manufactured into buttons, studs, &c. Two specimens were enclosed to us of very brilliant excellent-toned positives of female heads. Continental tastes are not always English tastes; but the hint is worth consideration.

Caution as to the Use of Photogenic Fire.—A fire occurred the other day in the New Road through the incautious, or rather culpably careless, use of the composition intended for burning in Moule's "Photogen." Business being dull, some relief from the tedium of waiting was sought by pyrotechnical experiments on a small scale; portions of the compostion were thrown into an open fire, to afford opportunity for watching the combustion, each time a larger portion being thrown. The final issue of a piece larger than usual being thrown, was the fire rushing out in front, quickly spreading round the room, and in a very short time the whole erection, which was of a slight and temporary nature, was in flames, which were not extinguished until it was burnt to the ground.

Arrowroot Paper.—A very exquisite little photograph printed on this paper was shown by Mr. Hill at the recent meeting of the North London Society. The delicacy of the surface was perfect, and rendered, with full justice, the fine gradation in the negative. Very pure in the whites and transparent in the shadows, it possessed, although a little over-toned, the best qualities of an engraving as well as those of a photograph. For artistic portraiture it appears likely to take precedence of all other papers. We believe Mr. Hughes has made arrangements for a supply from Germany.

Exchange of Large Pictures.—We have received some further communications on the exchange of large pictures; but only one name and specimen.

To Correspondents.

◆

Delta.—We regard a knowledge of art and its requirements, as absolutely necessary amongst the requirements of a good photographer in the fullest sense of the word. A man may succeed in many departments of photography, may be familiar with its chemistry and master of its manipulations without much art culture; but he will not succeed in the higher walks of the art.

Geo. Benson.—We will endeavour to ascertain and let you know in our next.

Hypo.—The fact that the process gave you good results at first proves that the material, probably the paper, and not the process, is at fault. The hypo may be kept ready prepared without injury. Allow the prints to remain longer in the toning bath, and keep the strength up of the silver solution.

An Amateur.—Possibly you touched the gold bath with fingers which had touched hyposulphite of soda, which would cause the decomposition and precipitation you describe. All old gold baths should be put into a stock bottle, and the gold thrown down by protosulphate of iron. See answer to W. G. G. in No. 111.

Isaac Hollis, Jun.—Your large print (which if we mistake not is of Mount Orgueil Castle, Jersey), is very good, and would no doubt be considered by most photographers a valuable exchange, if a club for the exchange of large pictures be established. All your specimens possess considerable excellence; they are good negatives beautifully printed, but they all have one serious artistic defect; unfortunately a defect so commonly occurring in many processes that it has come to be regarded as a beauty, and is produced by artificial means if it is not in the negative: we refer to *white skies*. These are destructive of everything like atmosphere in a picture, and mar the whole effect sadly. From the slight indication of colour we see in some where the "stopping out" is not quite perfect, we feel sure you would have had a beautiful natural aerial tint in your skies without stopping out, which has quite destroyed all harmony. We should have prized your specimens highly if they had not been so treated. Pray avoid it. We should be glad to see some of them printed without the stopping out.

Beta.—Alabastrine pictures should be backed with velvet, either black or marone, not with black varnish, which will, as you describe, turn them black, or at least dark and dingy looking.

W. D.—We have stated before that the great disparity in the prices of lenses by different makers arises from two sources: the difference in real excellence in the first place; and in the next place the qualities of those of good makers are *guaranteed*, whilst in the case of cheap lenses it is a pure matter of chance. Of those you name No. 1 is not a maker, but a dealer, and the lenses quoted are probably common French ones. No. 2 is a maker, and we have known some very good lenses come from the establishment. No. 3 is an optician, but not we believe a maker: we have no knowledge of the lenses he sends out.

A. Glo.—In draining an accumulation of nitrate of silver sometimes occurs at the lower end of the sheet, and that part would tone more rapidly than the rest. Excess of silver aids toning, and the slaty tint is probably overtoning in that part. Drain from a corner.

Charles Eades.—We will, if possible, ascertain some particulars as to lamps for the lime light.

W. D.—See "Microscopic Photography," by James Nichols. If the lenses of your microscope are achromatic you ought not to have an image fringed with colour. We are not familiar with Smith and Beck's "Educational Microscope."

Glasguensis.—We have not personally tried Mr. Scott's method of printing and toning; but see no reason to doubt its permanency. There is no necessity for the addition of salt and carbonate of soda to the hypo if it be used fresh for each batch of prints. It may be kept mixed without risk. We prefer the use of salt and water before toning generally: good washing alone will serve the purpose. Some manipulators prefer ammonia, but either may be used with perfect safety if judgment and care be exercised.

T. G. Perry.—By all means keep your chloride of gold in a solution of definite strength; you may do so with perfect safety. 2. Shake up your discoloured nitrate bath with some kaolin in a bottle, and then filter.

Emil Seelig.—The Secretary of the Photographic Society is the proper person for applications regarding next exhibition.

A Young Lady.—There is nothing in your process of toning as you describe it which should cause the discolouration which your specimens exhibit. They have all the appearance of prints produced on paper which has been excited some time and discoloured in consequence, or perhaps the prints have not been excluded from light whilst toning, or between leaving the printing frame and toning. Do you use fresh hypo for fixing? The paper you mention generally gives good results. It will deteriorate by keeping, but not in a reasonable period. If you send a piece of the paper we will try it.

W. H. B.—You had better make a new bath for negatives, as the amount of nitric acid you state to be present in your positive bath will unfit it for the best results in negatives. You can, however, easily try it. The blue stains in your positives probably arise from imperfectly washing them between developing and fixing: the contact between the cyanide and the developing solution producing prussian blue.

Sugar.—We have not tried the process, and cannot, therefore, speak positively. In hot weather a few days at the outside we should think; but a little longer in winter.

K. C., and other correspondents, together with an article on Collodion by Herr Liessegang, on Printing and Toning on Albumenized Paper, by Mr Stuart; the Dictionary of Photography, and some other articles are compelled to stand over until next week from want of space.

Exchange Club.—*Erratum*.—The address of Mr. Emil Selig should hav been No. 9, Bloomfield Villas, Park Road, Stoke Newington, instead o No. 2, as published in our last. A supplementary list will shortly be published.

All Letters, Works for Review, and other Communications fo the Editor, should be addressed to the Office, 32 Paternoste Row, London.

THE PHOTOGRAPHIC NEWS.

Vol. IV., No. 114.—*November* 9, 1860.

LIME LIGHT FOR PHOTOGRAPHIC PURPOSES.

Numerous enquiries have reached us of late on the subject of artificial light for photographic purposes. We have from time to time in the article "Scientific Gossip" kept our readers *au courant* with the photographic probabilities promised by various recent discoveries in this direction. We have now the pleasure of announcing, that we hope shortly to be able to publish the results of some experiments undertaken with a view to test the photographic capabilities of the lime light, and the facilities for their easy adaption. The experiments promised are to be undertaken with a small apparatus on a small scale, so as to suit amateurs or professional photographers, *cheapness* and *efficiency* being the desiderata.

The long winter season now before photographers invests experiments of this kind with peculiar interest, and we should have been glad if the promises held out by the announcement of the Lime Light Company, could have been tested by many of the able experimentalists amongst our readers. In the meantime we lay before our readers, from many of whom we have had enquiries on the subject, the following letter, in reply to a communication we had forwarded to the Company :—

33, *Cornhill, London, E.C.*
November 3, 1860.

Dear Sir,—I am in receipt of your letter requesting information on the subject of the lime light. This company being at present in its infancy, have not undertaken the manufacture of their patent lamps, for the purpose of photographing, or for photographic experiments on a small scale; even the lighting of shops we have not undertaken, unless the contract to do so was of sufficient magnitude to bring in a large remunerative profit; but they do undertake to manufacture the lamps for those who choose to pay their price.

This company could not furnish lamp and apparatus to any one under about £20, which would, you see, place it beyond the reach of small photographic experimentalists.

The address of our works is 36a Belvedere Road, where any one may see the lamps if they wish it.—I am, dear sir, yours truly, Stafford Squire Baxter.

G. Wharton Simpson, Esq.

In another column an Article will be found detailing some experiments by Mr. Malone on the printing of positives by the electric light. It will be seen that further experiments are to follow, and we trust that from the efforts of a gentleman possessing Mr. Malone's well known scientific eminence, valuable results may be expected.

POSITIVE COPIES BY THE ELECTRIC LIGHT.

BY T. A. MALONE.[*]

I beg to lay before the society a small contribution and specimens, which may be interesting to practical photographers generally, and which may perhaps be occasionally of great service to both professional and amateur operators as well as to the public. The difficulty of producing satisfactory positives in the winter time is well known, a whole day's exposure having sometimes been found insufficient for producing on the ordinary copying paper, a single impression from the negative. The prompt execution of portraits and other work has, in such cases, hitherto, been impossible. Having lately turned my attention to experiments with the view to the use of artificial light for purposes of scientific photographic research, during the too frequent absence, this season, of our master-light the sun, I have ascertained that one or more negatives of moderate size may be copied in a quarter of an hour by simple exposure in the usual copying frame to the rays emanating from the gas-carbon points of Duboscq's electric lamp; by concentration with a mirror and lens the effect might be produced in even a less time. On the day of the experiment, a dull October day (2 to 3 p.m.), the same amount of exposure to the zenith light, the sun being obscured, gave but a faint impression with part of the same negative that was used in the photo-electric experiment. The sensitive paper used was also like the negative purposely halved in order to make the experiment, a fairly comparative one. It will be observed that the resulting pictures, fixed simply in hyposulphite of soda, and not toned by gold, present characteristic differences of colour. That produced by the yellowish foggy daylight is inferior in colour and richness, and depth of tint to the one obtained by the brighter, purer electric light. I have observed some years ago a similar difference when one and the same negative was copied on a dull day half under a yellow glass, and half under a blue one. A final comparison of results indicates that the electric light surpassed in quality the daylight with which we were favoured on the day in question. It will be observed that the result of the experiment is further useful as proving that all the ordinary processes of our art can be rapidly and clearly demonstrated to an auditory or class at any hour—by night or day. Moreover, the relative photographic power of the electric light being thus more exactly demonstrated, I hope to be able to use it for important researches during the winter, when the sun is absent. I think my results already show that it is a superior agent to atmospherically deteriorated sun-light. I trust on a future occasion to be able to communicate the results of experiments I have determined upon, with a view to compare more thoroughly the relative photographic properties of these and other varieties of light. In conclusion, I think it right and only just to state that I owe to Mr. Gassiot, whose liberality in such matters is well known, the use of the Grove's battery of 40 cells which served for the experiment; and to one of our members, Mr. Warren Delarue, I am indebted for the Duboscq lamp. The laboratory of the London Institution furnished all the other requisites.

ON THE PREPARATION OF COLLODION.

BY HERR PAUL LIESEGANG.

No photographic agent has occasioned so much inquiry and research as collodion, which very soon after its introduction contributed to establish a new process which quickly superseded all others. Yet we are of opinion that it is not sufficiently perfect, but that it may yield greater stability in its results or more certainty in its operations. These properties can be obtained only by *harmonization*, or perfect suitability of the various preparations with each other, especially between the collodion and the nitrate of silver bath.

According to numerous observations and researches, the ether contained in the collodion is the principal cause of its decomposition and instability. For this reason we advise changing the solvent of collodion, and to employ, as Mr. Sutton does, a larger proportion of alcohol instead of an excess of ether; we had in our laboratory a collodion so composed more than a year ago, and used it with great success; it is stable and certain, and moreover possesses many properties which add still more to the superiority it enjoys over collodion containing excess of ether.

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[*] Read at the Meeting of the Photographic Society of London, on the 6th instant.

The Pyroxyline. Cotton always contains small resinous particles, which should be removed before it is submitted to the action of the acids, by boiling for two hours ten parts of cotton in a solution of five parts of carbonate of potassa to five hundred parts of distilled water; it is then washed for half an hour in several waters and left to dry in the atmosphere. By this preparation the cotton acquires the property of readily absorbing the acids, and of becoming more easily impregnated by them.

The cotton must be carefully dried, so that no moisture be introduced with it into the acids, which would bring about a spontaneous solution of the cotton.

In a glass vessel mix nine parts by weight of sulphuric acid, and seven parts of nitric acid, sp. gr. 1·43, adding the latter gradually to the former, stirring with a glass rod, and verifying the temperature by a thermometer. The mercury rises rapidly from 158° to 167° F. When the temperature has fallen to 140° the cotton is added, and is immersed in small tufts at a time. The temperature must be accurately noted; for if it rises too high a decomposition with the disengagement of red fumes will take place; at a temperature below 140° the cotton is not sufficiently changed, and dissolves only partially in the solvents of collodion. The temperature must not fall much during the preparation, which can be prevented by avoiding currents of air, or by placing the vessel in warm water in cold weather.

When a certain quantity, say 6 per cent., of cotton is immersed in the mixed acids, care must be taken that it is thoroughly moistened by the liquid, and free from air bubbles, else it would be decomposed, which will also happen if too much cotton be added.

It is not advantageous to prepare more than 250 grains of pyroxiline at a time, because in operating upon a larger quantity it is difficult to moisten the whole, and besides, the last portion immersed is not sufficiently altered, while the first remains too long in contact with the acids. After the lapse of five or six minutes the acid is poured off, the cotton pressed between two plates of glass, and quickly washed in several waters. To remove every trace of acid the cotton is left for several hours in a large quantity of water, or what is better, left in a current of pure water, and lastly washed in warm water.

The pyroxyline is then pulled out into little tufts, and spread upon large sheets of bibulous paper to dry in the air. It is best preserved in bottles stopped, not with corks, but only with paper. In a vessel tightly closed, containing moist air, the cotton tends to decompose, turns brown, and becomes fluid.

Cotton prepared according to this formula dissolves completely and rapidly in a mixture of alcohol and ether, without depositing impurities or precipitation of any kind.

In preparing it especial care must be taken to have the nitric acid sufficiently strong.

The same acids cannot be employed a second time; the cotton must be kept stirred during the whole time of its immersion.

The causes of failure in the preparation are principally:—

In operating upon more than 250 grains of cotton at one time.

In using acids of too great strength, or at too high a temperature.

If the cotton be taken in a humid state, or it be not sufficiently washed.

A characteristic indication of bad preparation of the cotton consists in its not dissolving completely in the alcoholic ether, but deposits a dense precipitate at the bottom of the bottle. If such a collodion is allowed to settle, and the supernatant portion poured off the heavy deposit, it will not give a sufficiently dense film, but one full of white spots, which is easily removed from the glass plate.

The Normal Collodion. Photographic collodion consists of a solution of pyroxiline in a mixture of absolute alcohol and ether. Neither absolute alcohol alone nor ether alone dissolve pyroxyline, a mixture of these two fluids is necessary; but is necessary also to ascertain in what proportions they must be used. If the ether be in excess, it will dissolve only in the proportion of 1 to 1½ per cent. at the most; to obtain a clear preparation, and one free from sediment, we may dissolve 2 or 3 per cent. But if we use an excess of absolute alcohol, a good collodion can also be prepared with 3 per cent.; it will dissolve 8 or 10 per cent. without giving a sediment.

The best solvent for gun-cotton is a mixture containing much more alcohol than ether. This collodion is more fluid than one containing more ether; it is almost structureless: it adheres well to the glass and gives a dense and vigorous film.

The ether is the principal cause of the instability of of iodized collodion. If iodide of potassium or of ammonium be added to ordinary collodion with excess of ether, the liquid decomposes, becomes red in a few days, and loses its sensibility and other good qualities.

If, at the same time, with the same materials, and under exactly the same conditions, we iodize two samples of collodion, the one being alcoholic and the other etheric, no matter what the base of the iodide be, the alcoholic collodion is always by far the most sensitive. Alcoholic collodion does not become red even in contact with the most unstable materials; a sample left exposed to light for two years completely preserved its primitive pale yellow colour, together with its sensibility and fluidity.

While pouring etherial collodion on the glass plate it is but too apt to form inequalities, clouds and streaks; alcoholic collodion flows uniformly, and even without particular care.

The following are the best proportions for normal collodion:—

In a clean bottle put absolute alcohol	370	parts
Dry and loose pyroxyline	10	,,
Sulphuric ether sp. gr. 715°	200	,,

stir it or shake the bottle gently until the whole of the cotton is dissolved, and leave it to settle for several hours. If we wish to obtain clean proofs we must not employ the collodion before it has become quite clear and limpid. The clear portion must be carefully decanted from the sediment, which consists principally of particles of dust, and small fibres of insoluble cotton.

The alcohol must be absolute and perfectly pure, and all the other ingredients of the best quality.

Iodized Collodion. For sensitizing the collodion the following solution is employed:—

Absolute alcohol sp. gr. 817	100	parts
Bromide of Cadmium	2	,,
Iodide of Lithium	6	,,
Iodide of Cadmium	6	,,

Shake the mixture until the salts are dissolved, then filter the solution. Add 10 drachms of this solution to 100 drachms of normal collodion; it can be used the following day.

The iodides must be absolutely pure and not too old. Iodide of lithium is a very sensitive and deliquescent preparation; it must be kept in a well-stoppered bottle in the dark. It is preferable to dissolve the iodides in the alcohol before adding them to the collodion, in that way we avoid a host of failures, among others the small transparent spots that so often appear in negatives.

The addition of a little bromide increases the sensibility of the collodion, and produces more harmony from different colours; the proofs also are softer, not so violent in the contrast of tone, as when iodides only are employed. It is remarkable that a collodion simply bromidized gives much more contrast than a collodion simply iodized, while the two united render the various tones more harmoniously.

We are decided as to the combination of the salts of lithium with the salts of cadmium; because the iodide of lithium gives very clear and vigorous negatives; but employed alone it tends to decompose the ether, while combined with iodide of cadmium, it is very stable. These two salts are equally soluble in absolute alcohol. No advantage results from the employment of other combinations of bromine and iodine with iron, zinc, silver, magnesium, sodium, &c.

If the collodioned plate be immersed in the nitrate of silver bath too soon, the film remains *greasy*, and will not receive the solution. It will take from forty to fifty seconds to *set*.

PHOTOGRAPHY AS IMITATIVE ART.

(From a "Photographer's Common-place Book."*)

> "It is not now the time to ask, what is the use of art? Such a question is not worthy of an answer. Beauty is its own great use, which cannot be measured by petty utilitarianism. Shall the shallow demands of an every-day interest, the short sighted policy of a petty traffic, the obsequious deference to a narrow self-advancement, be compared for a moment with those arts which are set far above the tumult and turmoil of life, and exist only in the pure recesses of the soul? Is the penny one puts in his pocket more than the thought with which he dowers his mind? When we have piled our golden sheaves, and have wherewithal to feed and clothe our bodies daintily, have we attained the end of life? Lies not the great problem of self-culture far beyond, a deeper and more central want than that of the senses?"

Although some of the following ideas and remarks have already been embodied in a formerly published article of mine, my modesty (?) induces me to think them sufficiently worthy of reproduction, somewhat modified, for the perusal of the more extended circle of readers to whom I now have the pleasure and honour of gossiping.

In an article recently quoted in these pages from the *Westminster Review* it was said "Imitation of nature is at once the fundamental idea and the perplexity of art," and that "on the method and amount of imitation the warfare has raged in the schools from the days of Zeuxis to the days of Millais." The strictly imitative nature of photography has thrown no little light upon this question, so perplexing and confusing to amateurs and critics, and its influence may be clearly traced in the improved and rapidly improving condition of British Art.

As, however, the grand objection, a certain class of critics still advance against our art, lies in this very quality of truthfulness, the remarks I now pen may not perhaps be without their use and importance.

While photography advanced in all its optical, chemical, and mechanical departments,—and while the sphere of its utility became more and more enlarged, and its applications more and more numerous, scarcely so much as a genuine desire seemed to be expressed towards the source of artistic effect. The most shadowy of scientific theories, the most trivial improvements in unimportant formulæ, the most impracticable of processes, and the veriest apprentice piece of cabinet work has, in its turn, been thought more worthy the attention of Societies and the pages of journals than the subject of artistic photography. As the petted offspring of science, the art has been nursed and reared in an atmosphere little calculated to encourage or cultivate the refinement and taste so essential to the productions of art. The philosopher, raising what Lake Price calls 'the parrot cry of sharpness,' denounces with unmeasured severity every production which will not bear a microscopic investigation; all the beauty, poetry, and suggestive power of the most artistic of photographs would be valueless to him if unassociated with qualities exclusively scientific; qualities which cannot (save in some few exceptional cases) be harmoniously blended with those more purely artistic. Thus it came about that photography assumed a strictly scientific guise, that it scorned beauty, refused to be graceful or refined, and discarded art; that it absolutely gloried in its greatest defects, asserting that they were proofs of its honesty and uncompromising truthfulness, and, like a vulgar favourite of fortune, made a loud and noisy boast of its nature's meanest qualifications. But in the next stage of its progress there came a change, although its increased fidelity had procured it even more value as a scientific agent, and although the philosopher seemed to discover for it an interminable series of invaluable scientific applications—it had then reached public favour through the medium of the love of art, and began to speak of itself as 'one of the fine arts.' Naturally enough, pretensions based upon the most perfect ignorance of nearly every artistic quality, and destitute of the slightest aspirations above that of imitation without selection, or selection without the power of judiciously selecting, excited no little ridicule, and brought about severe attacks, from art critics, in most of our leading publications.

And now the art is again in a state of transition. Atmosphere and shadows no longer fright our cameras from the field; the evanescent effects of nature in her more picturesque aspects have been seized and successfully rendered*—that which has been vaunted as 'sharpness,' and decried as 'hardness,' and which is certainly opposed to the theory of binocular vision, no longer holds the high position once so universally accorded to it; and, in all its aspects photography begins to assume the complexion of art.

With regard to a certain school of art criticism, whose disciples hold imitation in such profound contempt, it must not, cannot be expected that these will ever recognize photography as art. As to deception and imitation being one and the same thing it will need no conjurer to show that neither the painter's nor the photographer's imitation, however faithful, can really deceive the eye, or to prove that we never lose sight of the fact that in either case we are merely looking at pictures. I am not inclined however to enter into controversy on this subject, because I know that to do so would be merely cutting off the ever reappearing hydra's heads, of which it was said the destruction of one was the begetting of another. The degree of imitation which is legitimate in art has not yet been decided. Du Piles states that *the end of painting is to deceive the eye* (?) This is the one extreme, and, for the other, in his celebrated 'discourses,' Sir Joshua Reynolds tells us that '*painting is, strictly speaking, no imitation at all of external nature*" (?) H. Howard, in one of the lectures he delivered as President of the Royal Academy, said 'the copy may and will please us the more, from being in a high degree illusive, because we are still more impressed with the artist's ability; but if the imitation be so close as to deceive, and we believe the objects to be real, it follows that for us neither the art nor the artist have any existence; but,' added he, 'a very slight degree of imitation is sufficient to satisfy us.' Craig justly says of the painter, who substitutes the images of his imagination for those of nature, that he may be compared to one 'who sits ruminating before the fire, fancying that he sees in various parts of the burning mass, mountains, figures and faces, but who, on pointing these out to his companions, finds they can trace no such resemblance.' In reference to this subject I might heap up a mountain of contradictory assertions, each of which should emanate from 'a good authority,' but the only result would be to prove the unsatisfactory language in which the rules of art have been enveloped (more particularly on this subject of imitation), and to show *how imperfect our present art nomenclature is for the purpose of explanation*.

A close imitation of nature is held to be inconsistent with true art on various grounds. 'It leaves nothing for the imagination of the spectator' cries one. 'The perfection of unimportant details distracts the attention from the loftier aim of the artist,' exclaims another. 'It is the soul we want, not the earthy body,' says a third; and so on, to much the same effect, evermore. Now, is the imagination of the spectator to be given no higher task than that of providing such inferior details as the painter has omitted? Will not important details demand of themselves more attention than those which are less important? And is there no advantage in combining with the soul that body without which it is a mere abstract idea, as impossible of expression on the canvass of the painter as it is on the chemical surface of the photographer's plate? Listen to no such subtle arguments, ye earnest sons of the camera. First study to *perceive* the beautiful, then go to nature, and when your souls kindle into enthusiasm at her glories, and the poetry of truth steals into your opening hearts from her exhaustless font, be sure that the more faithful your transcript of her divine charms, the more surely will the feelings they originate become embodied in your works to engender, in kindred hearts kindred sympathies, and those majestic thoughts and noble emotions which constitute high art's loftiest aim. Alas! there is little fear of our being *too* true to nature. The rough diamond may be polished and cut by art until its flashing radiance dazzles and delights every beholder, but a star of nature, set in the blue space above, turns its tiny speck of light to darkness the moment they are seen together. Most of our writers on art mistake the means for the end. Like the Chinese Emperor who denounced the European's perspective drawing because it was too much like nature and too little like a picture, they make that their proudest boast which is, in fact, a mere proof of their egotism and weakness. It is the littleness of art which demands scientifically constructed crutches, and makes it hug so closely, and exalt so unduly its ingeniously compounded æsthetics; but it is the greatness of art which merely regards these things as the valuable aids demanded, by its feeble and imperfect nature to pursue the great object of its dearest hopes and most passionate love, its highest and *all including aim, the truthful representation of nature.* Now if that art which in all its highest essentials ranks so far above photography, which claims the mighty aid of colour and a power of selection and combination which we of the camera cannot hope for; if *this* art owes so much in the estimation of great painters to the artificial aid of a certain code of laws, surely it needs no argument to prove how eager the photographer should be to secure their powerful assistance. Firmly convinced that photography *may* take its ground as one of the fine arts; that a pitch of excellence may be in this respect attained which has yet scarcely been hoped for, I call upon photographers to aid in bringing about such a glorious consummation; and, for myself (without pretending to any particular fitness for the task) I shall persevere in opposing and endeavouring to refute, on all occasions, the hostility and doctrines of those who would fain depress the minds of our more aspiring operators, check their praiseworthy efforts, advocate unworthy aims, or otherwise lower in public estimation the young and flourishing art of photography. A. H. W.

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* Continued from p. 315.

* No one who has seen the pictures of Lydon Smith, Wilson, Fenton, and some others can doubt this fact.

SCIENTIFIC GOSSIP.

A very ingenious plan of actinometry has been lately suggested by Mr. C. J. Burnett. This gentleman prepares a liquid containing oxalic acid and a solution of a persalt of iron, which when it is exposed to the chemical rays of light continuously evolves a gas (carbonic acid). This gas he allows to pass up into a graduated tube where its bulk can be ascertained. Behind this tube of gas a sheet of sensitive photographic paper is allowed to pass at a uniform rate, when, by appropriate optical means, the light from a lamp placed on the other side of the gas-tube can be made to pass through the upper part of the latter, and thus register photographically its height upon the sensitive paper, in the same manner as the height of the barometer and thermometer is registered at Oxford, in the photometeorographic apparatus. The sheet of sensitive paper being made to move laterally at a known speed by clockwork, the variations in the direction of the uniformly rising diagonal line marked on the paper, would be an accurate expression of the actinic intensity of the light which fell upon the oxalate of iron solution. In a note forwarded by the author to the editors of the *Philosophical Magazine* for this month, he suggests some further improvements in this instrument. In the first place he states that there are great difficulties connected with it in its original form, particularly in determining what would be the *direction* on the paper of the above-named diagonal line, which would be equivalent to a *uniform* actinic action, since the amount of gas evolved from the liquid under the influence of a constant actinic force would decrease with the strength of the liquid, and consequently the line of equal actinic influence would not be straight, but curved. This source of error he now proposes to obviate, by operating, not continuously with one portion of liquid, but with *separate* portions *successively*, uncovered for a fixed period, and again covered up by proper clockwork arrangement. Suppose, for instance, that such a compound actinometer has been at work for a day of twelve hours, registering successive hours or half hours, the observer has only to note at the expiration of the twelve hours, or before refilling and setting the instrument to work again, at what point the surface of the liquid in each of the twelve or twenty-four register tubes stands. Separate photographic assistance is hardly required here; still for very compound instruments, intended to work for a long period without attendance it may be usefully employed; and even in other cases it is quite possible that the phenomena connected with persistent rest and action of the sensitive liquid may render its employment advantageous. This can readily be managed by having the full number of sensitive-liquid reservoirs, corresponding to the periods to be registered; but instead of giving *each* its own register-tube, to have them all communicating with one register-tube. This would much simplify the photographic registry, which would be effected by having the paper moved past the tube with a jerk at every half hour, or other period corresponding with that at which the sensitive reservoirs are closed.

At the same time Mr. Burnett suggests another important form of actinometer, which we think has many advantages over the complicated arrangement of M. M. Bunsen and Roscoe. It will be remembered that the latter physicists employ for this purpose a mixture of chlorine and hydrogen gases, which by the action of the chemical rays of light unite together and form hydrochloric acid. One disadvantage of this mixture is that it is so excessively sensitive that it unites with a violent explosion the instant it is exposed to the sunshine, or even to bright daylight, and Mr. Burnett therefore proposes to employ instead a mixture of carbonic oxide and chlorine. This gives a ready means of estimating the amount of action which has taken place by the condensation effected, as the two gases in combining, which they do quietly even in sunshine, to form *phosgene* or *chloro-carbonic acid* gas, shrink to one-half their previous volume. To render this condensation conveniently visible, we have only to carry a tube from the reservoir containing the mixed gases, into a vessel containing a liquid which will neither absorb nor in any way be acted on by the mixed gases, the absorption being of course indicated by its rise, and the exact amount of that being easily shown by means of a scale.

The subject of the preservation of wood from the effects of fire and moisture is one of importance to the photographer. The cameras, frames, plate-boxes, &c., which he employs being frequently exposed to the influence of these agents. We would therefore draw their attention and that of the manufacturers to a patent which has just been taken out by a French gentleman, M. E. Stelzl, for improvements in ornamenting surfaces of wood &c., and in protecting them from the action of fire and moisture. The invention relates to the production of ornamental painting or colouring upon wood, plaster, glass, &c., of the kind known as fresco painting or colouring in distemper. The substances which the inventor prefers to employ for this purpose are alkaline silicates, but any other compounds may be used which shall have the effect of saturating with silica the surfaces to be ornamented, and thus rendering them unaffected by heat or moisture. The surface to be thus saturated with silica must be capable of resisting the action of the brush, so as not to scale or rub off when the silica compound is applied. It must also be of such a nature as to be capable of receiving layers of silica compound sufficiently concentrated not to require many applications. These results are obtained by the employment of the following composition:—He takes 20lbs. of cuttings of white skins, 200lbs. of water, and after it has been well boiled and strained he mixes therewith 2lbs. of gum tragacanth, previously dissolved in a sufficient quantity (say from fifteen to twenty times its weight) of water. When this has been laid on, two layers of silicate of potash are to be applied, the first being diluted with water until it shows a strength of 10 deg. Baumé, and the second 20 deg. Baumé; these two layers of silicate of potash will suffice to render the surface prepared as above described insoluble and unaffected by moisture, and incombustible. Instead of applying two or three layers of size upon the wood, and then two successive layers of silicate of potash, as above described, the patentee sometimes applies, according to the nature of the work required, two or three preparatory coatings, and then, according to the degree of finish, tint, and durability required, applies two layers of the same tint, ground with water and mixed with silicate of potash at 25 deg. Baumé. This process seems likely to be very valuable. It would be advisable for all the woodwork connected with the photographic process, not only the expensive apparatus, but also the plate boxes, and even the floor of the dark room, to be silicated in this way, as the injury from damp or fire would be rendered far less.

Arsenic seems to be a more generally diffused metal than was at one time imagined. Some time ago we gave an account of the discovery of this poisonous metal in a drinking water. We now find, according to some experiments of Mr. Campbell, given in a recent number of the *Chemical News*, that this metal is a constituent of the sands of most rivers, although as yet it has not been often found in solution in the water which flows over these sands. It has still more recently been found in most specimens of coal, and as arsenic is a very volatile metal, and would easily fly off when an arseniferous coal is burnt, it follows that the atmosphere of our towns ought to be charged with it. This is not by any means a pleasant idea for us who disbelieve in the beneficial effects of long-continued small doses of arsenic.

ON AN ALLEGED NEW PROPERTY OF LIGHT.

BY T. A. MALONE.[*]

I have, from the first announcement of M. Niepce de St. Victor's alleged discovery of a new property of light, taken a constant interest in the controversy to which it has given rise. I have ever been sceptical as to its truth, thinking it might be explained by a reference to known physical laws. Although I had formed several opinions as to the cause of the result, I took no experimental steps until after the appearance of Mr. Crookes's demonstration that the heat and moisture of the tube, joined to the tartaric acid used, were sufficient to account for the result of M. Niepce's main proof experiment. M. Niepce, thus apparently set right, replied to Mr. Crookes by making the same experiment under a freezing mixture arrangement. He still got the result he had all along insisted upon; but he owned that heat and other agents could simulate his original results. Not observing any reply from Mr. Crookes—who I believe was then much occupied—I determined to read M. Niepce's original papers, in the *Comptes Rendus* of the French academy. I there found that M. Niepce set out in a manner dangerous for most experimenters; namely, with the notion that light *might be* absorbed by bodies in such a way as to be given out again; the action to be made manifest by photographic papers. A great number of experiments made in a variety of ways convinced him that he was right in his conjecture. Disregarding, for the present, his earlier forms of experiment, I decided on examining most scrupulously his latest result, given in reply to Mr. Crookes. I read carefully his note, and was at once struck with the form of his experiment. He places between the vessel containing the alleged stored-up light a piece of paper, having impressed upon it what he calls "gros caracteres," which by some odd association of ideas I interpreted it to mean the heading of a newspaper. I came upon this thought by recollecting that the French printers use an ink which is very offensive to an English taste, and it at once occurred to me that the tarry ink might be at the bottom of M. Niepce's result. I had previously made experiments with kreosote of wood-tar, and found it to act upon nitrate of silver. Whatever these notions were worth, they induced me to resolve to try at once M. Niepce's experiment minus the chief agent—the light. I took advantage of the opportunity the London Institution newspaper-room affords to secure a freshly-arrived copy of the *Indépendence Belge*, the bituminous odour of which was unmistakable. It was the evening edition, and arrived here early in the morning. I at once placed it in a dark room with its title-page in contact with a paper washed over with a neutral solution of nitrate of silver. I left the whole in the copying frame for an hour. M. Niepce names six hours. After that time, just as I anticipated, I got, by a wash of gallic acid, a distinct impression of the printed letters. They appeared to be positive, but on looking at the paper against the light, I found this appearance to be mainly due to the penetration of the gallic acid wherever the letters had been in contact: a *differential action* was evidently at work, and accounted for all the appearances. *No light was used by me during the experiment.* A copy of the *Times* newspaper, similarly treated at the same time, gave only the faintest indication of its title; only that I looked for it, it would have escaped notice. The other paper was distinct in its action. Upon drying the result a curious appearance was observed: the surface became faintly negative as though the printing ink had suspended, on the surface, the reduction of the silver salt. The *back* of the paper now presented an appearance well known to Talbotype photographers, namely, that of a negative become positive at its back. This I think due to the penetration of the gallic acid, and a consequent *internal* spontaneous deposit. These differential actions will doubtless now be made clear in all their relations. Upon informing Mr. Hardwich of my results, he reminded me of a paper by Mr. Busk, who proved that almost any engraving without exposure to light, could be shown to have the power of suspending the photographic properties of chloride of silver; but as he uses light at one stage of his experiment, his result differs from mine, and is not accepted by M. Niepce's advocates as a solution of the controversy. My experiment is, I take it, a simple repetition of M. Niepce's, minus the disputed agent, the light. I am still investigating further the exact physical and chemical causes of the varied phenomena which have so long perplexed us. I may perhaps be permitted to say that I regret that I have not been able to confirm the conclusions of one to whom we are so much indebted for the introduction of albumen into photography.

PRINTING AND TONING OF ALBUMENIZED PRINTS.

BY J. STUART.[*]

The question is often asked by those who are about to supply themselves with photographic mementoes of the living: "Are they permanent?" I have no doubt as to the permanency if proper precautions be taken to free them from the chemicals used in the fixing. I am sorry that so many think a few hours' washing will do for the freeing of the print from the hyposulphite. It has always been my opinion that mere soaking is not sufficient if they are intended to be permanent. To my mind a certain amount of friction is requisite to force a union between the water and the soda left in a newly-fixed print. Tepid water is an excellent substitute for pressure, as the soda dissolves much more rapidly in it than in cold water. I should not consider that prints floated in cold water would be at all permanent. It is the duty of all who are engaged in supplying the public with paper prints to do all in their power to make them permanent; if not, it will quickly tell upon themselves. The public will soon find out that they are not getting lasting mementoes, but "dissolving views."

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[*] Read at the Meeting of the Photographic Society of London, on the 6th instant.

[*] Read at the Meeting of the City of Glasgow and West of Scotland Photographic Society, October 4, 1860.

I cannot say much about the old mode of toning and fixing, as I had little experience in it—I mean that of adding the gold to the soda, as recommended by Mr. Hardwich in his "Photographic Chemistry." Till the introduction of a new mode I thought most of the *sel d'or* toning bath. The principal difficulty was to prevent the prints from running yellow. In other respects it gave very fine results. There was a richness of colour about them, and the half tones were well preserved. In consequence of the great care requisite in the washing when taken from the printing-frame, and my not being able always to attend to that matter personally, I was obliged to give it up. I have some prints toned by that method five years since, and they are as good as ever. The paper at that time was not so good as it is now—at least I did not find it so.

I have brought with me to-night a number of other prints done by the method which I am about to describe. I have selected them with a view of showing you what a variety of tones can be produced by it. To look at them one would hardly think them done by the same process. By no means do I lay them before you as specimens of our art, but merely for reference during the discussion which is to follow the reading of this paper.

For the printing, good paper is essential.—There is much bad paper in the market: it remains with you, therefore, to try and get the best. There is some good yet to be found. The plan I adopt is to try a number of samples till I get what I consider good, then secure as much as will keep me for some time. Having got good paper, the next thing is to get good prints, which is not such an easy matter as the procuring of good paper.

First, cut the paper to the size that will suit you best, so as not to force you to have an unnecessary quantity of silver solution on hand. For cutting the paper you should have a bone knife, kept clean, for the purpose. Handle the paper as little as you can. It provokes one very much to see a dirty fellow "paw" the paper all over; and then, if there should be any stains in a finished print, he is sure to blame the paper.

Secondly comes your silver bath.—Make it up to the strength of ninety grains to the ounce of water, adding one drop glacial acetic acid to every ounce of the solution.

At first thought some may think this a great waste of silver; but that is not the case, which may be proved by the following experiment:—Take ten ounces of a ninety-grain silver solution; pour it into a tray; then take the gross weight. Having previously cut twenty-four sheets of albumenized paper 8½ by 6½, take twelve of them, and float them just one minute each on the silver solution; preserve all the droppings, and add them to the tray. Now take the weight again, noting how much it has lost; then test for its strength: in this way you will find how much nitrate of silver you have lost. Next proceed in the same way, only take a sixty-grain solution and float three minutes, which is the time generally allowed. I found, then, that it had cost me 10 per cent. more for nitrate of silver in the sixty-grain solution, and the prints were not so good. The first showed the image upon the surface of the paper, while the other looked as if seen through a veil. It is not enough that you should make the bath of the above strength, but that you should keep it up to it; testing it when you have ceased using it. Bear in mind, also, that albumen tends to neutralise the acid first added; but keep it always acid. By testing it with litmus paper you will soon discover, by the colour of the paper, when it has enough.

Pour now your silver solution into a flat dish, to about the depth of ⅜ths of an inch. There is a danger in working with too little in the tray, as it is apt to cause bronze lines across the print: a halt when laying the paper has something of a similar effect. When you have the silver solution in the tray you will find a dusty sort of scum all over it, which no amount of filtering will remove. The only way of getting rid of it is to take a slip of paper and pull it over the surface, having its ends pressed close to the sides of the tray: letting down the paper without thus cleaning the surface of the bath would cause the paper to have a marbled appearance on its surface.

All being now ready to lay the paper, take it in your hand by the end; let the other rest on the silver solution. Now lower it down as you would a plate on a flat (or horizontal) bath, having the light between you and the silver, so that you may see air bubbles. Let it lie only one minute; then raise it up at the end first down, so as to give it all the same time on the silver solution. Dry it in the dark room quickly by means of a stove, or as may suit you best. When dry, lay it in a drawer, so that it may absorb moisture again, and thus be brought to a uniform state. You will find it to lie better to the negative, and to give better tones in this damp state. It will be found a great advantage, if there is a lithographic press at hand, to give the sheets two or three pulls through: it will make the prints much sharper, by giving the paper a finer surface. As to the keeping qualities of the paper just prepared, there is no fear of it for some time—I should say for about a week—if you keep it from the light and in a dry place. I have brought a canister with me to-night; there is paper in it prepared two months back. If some one would take and print upon a piece of it, it would satisfy them as to what can be done in that way. I would not advise you to prepare it purposely; but if it so happened that you could not get your prepared paper printed, it might suit your purpose well. It would be a great advantage to the photographer—and more so in the winter months—if he could keep the paper till the light would suit. I have never been successful in the keeping of paper that has been floated on the silver three minutes.

Having followed these instructions, and thus got your sensitised paper, you must look to your negative. If it is thin you had better turn it into the shade, as it will not print so well in sunshine, which has too powerful an effect upon the intense parts of your negative, causing the face to look flat and grey; but if, on the other hand, the negative is strong or dense, the best effect will be got in sunshine. In fact, to print with taste, you should have two kinds of paper prepared—one as rich in silver as possible, and another a slightly salted and silvered kind—using the strongly silvered kind for the thin negative, and *vice versâ*. I had almost said it was a shame, but it is a pity, that those who albumenize paper do not mark how much chloride it contains: till they do so, or we prepare it ourselves (which by the way is no great trouble), we must be in a state of uncertainty as to what we are doing.

(*To be concluded in our next.*)

NEW MATERIAL FOR PAPER.

The following exceedingly interesting communication on a novel kind of straw paper is based upon an article in the columns of the *Breslauer Gewerbeblatt*:—

Many of the qualities described as pertaining to this new paper are the exact characteristics required in paper for photographic purposes. If the discovery be all that it is described, important results to paper photography may follow.

Among the many endeavours that have been made both in ancient and modern times to procure a fit substitute for paper, one at length has been crowned with success. Recent experiments have proved Indian corn to be in many respects actually superior to rags, hitherto the only material found to be really available for that purpose. The discovery to which we allude is a complete success, and indeed, may be expected to exercise the greatest influence upon the price of paper within a very short time. Indian corn, it is true, cannot be grown except in countries of a certain degree of temperature—at least not with the prolific result of warmer climates; yet the plant is of frequent occurrence all over the continent of Europe, and can be easily cultivated to a degree more than sufficient to satisfy the utmost demands of the paper market. Besides, as rags are likely to fall in price before long, owing to the extensive supply of material resulting from this new element, the world of writers and readers would seem to have a brighter future before it than the boldest fancy would have imagined a very short time ago. This is not the first time that paper has been manufactured from the blade of Indian corn: but, strange to say, the art was lost, and required to be discovered anew. As early as the seventeenth century, an Indian-corn paper manufactory was in full operation at the town of Rievi, in Italy, and enjoyed a world-wide reputation at the time; but with the death of its proprietor the secret seems to have lapsed into oblivion. The manifold attempts subsequently made to continue the manufacture were always baffled by the difficulty of removing the flint and the resinous and glutinous matter contained in the blade. The recovery of this process has at last been effected, and is due to the cleverness of one Herr Moritz Diamant, a Jewish writing-master in Austria. Having busied himself for some time in experiments on Indian corn, the ingenious discoverer has at length been rewarded with the desired results of his labour; and a trial of his method on a grand scale, which was made at the Imperial manufactory of Schlögelmuhle, near Golnitz (lower Austria) has completely demonstrated the certainty of the invention. Although the machinery, arranged as it was for the manufacture of rag-paper, could not, of course, fully answer the requirements of Herr Dismant, the results of the essay were wonderfully favourable. The article produced was of a purity of texture and whiteness of colour that left nothing to be desired; and this is all the more valuable from the difficulty usually experienced in the removal of impurities from the rags. Knots and other inequalities of surface so frequent in the ordinary paper, and which give so much trouble in printing, the new product is entirely free from, and this without the material undergoing any special process to attain the desired end.

Another immense advantage, and this in an economical point of view, is the reduction of the steam power required in the manufacture by *one-third* of its present amount, in consequence of the material being reduced to pulp by chemical, and not, as at present, mechanical agency. The present proprietor of the invention is Count Carl Octavio Zu Lippe Weissenfeld, who has bought it from the originator; and from several experiments deduced the following result:—

1. It is not only possible to produce every variety of paper from the blades of Indian corn, but the product is equal, and in some respects even superior, to the article manufactured from rags.

2. The paper requires but very little size to render it fit for writing purposes, as the pulp naturally contains a large proportion of that necessary ingredient, which can at the same time be easily eliminated if desirable.

3. The bleaching is effected by an extraordinarily rapid and facile process, and indeed, for the common light coloured packing paper, the process becomes entirely unnecessary.

4. The Indian-corn paper possesses greater strength and tenacity than rag paper, without the drawback of brittleness so conspicuous in the common straw products.

5. No machinery being required in the manufacture of this paper for the purpose of tearing up the raw material and reducing it to pulp, the expenses, both in point of power and time, is far less than is necessary for the production of rag paper.

Count Lippe having put himself in communication with the Austrian Government, an Imperial manufactory for Indian corn paper *(maishalm papier*, as the inventor calls it), is now in course of construction at Pesth, the capital of the greatest Indian corn growing country in Europe. Another manufactory is already in full operation in Switzerland; and preparations are being made on the coast of the Mediterranean for the production and exportation on a large scale of the pulp of this new material.

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 7th November, 1860.

At the last meeting of our Photographic Society, M. Poitevin, to whom photography is indebted for many curious and valuable processes, communicated his method of obtaining pictures in carbon or coloured powders.

This method is based on the remarkable property possessed by a mixture of perchloride of iron and tartaric acid. When exposed to light this mixture gives rise to a hygroscopic and deliquescent protochloride of iron; while the portion of the mixture upon which the light has not struck does not attract any moisture from the atmosphere. It may be easily understood how we can turn this remarkable property to account, in applying to any kind of surface, without previous moistening, powders of very varied nature, so as to produce every kind of design a photographic negative can yield.

The surface upon which the design may be obtained can be either paper, ivory, glass, porcelain, textile fabric; in a word, any substance which does not spontaneously reduce the perchloride of iron. The powder will vary according to circumstances: it will be of carbon when the design is to be formed in black and white; or of a fatty acid or resin for the subsequent application of printing-ink; or an enamel or metallic powder when it is to be permanently fixed by fusion after its application; or a substance which acts as a reserve in engraving with nitric or hydrochloric acid, &c.

The mode of operating is thus described by M. Poitevin:—I take, in the first place, as an example, a perfectly clean glass-plate. If it be a ground glass, I at once spread over its surface a mixture of ten drachms of perchloride of iron and four drachms of tartaric acid, dissolved in 100 drachms of water, and then set the plate upon its edge to dry. If it be a polished and transparent plate, I first cover it with a coat of collodion, or other gummy, glutinous substance, naturally insoluble in the cold, or rendered artificially insoluble by coagulation or other means. On the still moist surface of the collodioned or gummed glass I pour several times the mixture of perchloride of iron and tartaric acid prescribed above, and leave it to dry. This mixture may also be employed with the addition of a gum not precipitating the salt of iron.

When the prepared surface is perfectly dry it is placed under a negative with the design to be produced, and exposed to the sun for five or ten minutes, according to the season and the strength of the negative. After this exposure to the light the picture is scarcely visible on being taken out of the pressure frame; but it possesses the property of attracting moisture from the ambient air, but only on those parts which have been acted upon by the light passing through the negative. To cause the image to appear by means of a substance in powder, I apply it with a very soft brush. The design gradually makes its appearance, and the pigment is retained only on those parts upon which the light has acted; the design is henceforth unchangeable; it is slightly tinged in the whites by the iron salt. If it be desired to produce a transparency it is washed with water alcoholized and acidulated with hydrochloride acid; then dried and varnished. If a design on glass be sought for we employ enamel powders or metallic oxides to form enamels with the flux; the glass plate is afterwards passed through the furnace as in ordinary glass painting.

In most cases designs on paper will be required; the means I employ to produce the design on paper in carbon or coloured pigments, is as follows:—immediately upon obtaining the design, I pour on the surface of the glass a coating of simple collodion, then immerse the plate in water until the surface of the collodion is well moistened, and then wash it with acidulated water. Upon washing the surface again, I apply gelatined paper to it, and leave it to dry: upon detaching the paper it brings the film of collodion to which the colouring body is fixed off with it. I next varnish or gum the design, and mount it on card-board, it is then completely permanent. As this transfer reverses the design, it is well to employ reversed negatives, or what is still better, transfer ordinary collodion negatives to paper.

M. Poitevin's method is, I think, essentially different from those proposed by Mr. Wyard, of Bristol, or by M. Joubert, and appears to be thoroughly practical.

I recently alluded to Messrs. Person and Sire's process of electro-zincing; I am now enabled to furnish the details. Dissolve 10 parts of alum and 1 part of oxide of zinc in 100 parts of water, this is the zincing bath, which should be kept at a temperature of 60° F. The pieces of metal to be zinced, being first scraped, are arranged so as to constitute the negative pole of a pile; at the positive pole one or more plates of zinc are fixed, according to the form of the pieces to be zinced, and having nearly the same dimensions. The poles of the pile thus arranged are plunged into the trough containing the alumina bath. By the action of the current of a single element, the dimensions of which increase proportionably to the surface to be zinced, the reduction of the zinc is effected as easily as that of copper in galvano-plastics, and the deposit is made indifferently upon all the metals, upon platina as well as upon iron or copper. When the zinced copper is heated it forms a coating of brass, and this transformation can receive various applications. Elevation of temperature in zinced-iron augments the adherence of the coating of zinc. Messrs. Person and Sire affirm that the thickness of the layer deposited increases proportionally with the time of immersion, that the reduced zinc has all the properties of the purest zinc, and that it completely prevents the oxidation of the object covered with it.

The saponification of fatty matters may be effected by the action at high temperatures of anhydrous earthy or metallic carbonates, without the intervention of water. In putting in contact, at a temperature of 280° to 300° F., a fatty substance, tallow, for instance, with carbonate of baryta and magnesia, the fatty acids which the tallow can engender are eliminated, at the same time the glycerine is destroyed or decomposed into its elements. This is a very singular reaction, and may admit of important economical applications.

A good deal of ingenuity has been directed to improvement in the making of leather, to replacing the tan in the process of converting fresh, dried, and salted skins into leather; still most of the leather found in commerce is tanned by the old process, which requires a twelvemonth to accomplish the desired object.

A M. Van Koulhergen has effected the desired improvement. By the application of *divi-divi* to tanning skins, and in perfecting the various operations of the process, he can accomplish as much in fifteen days as has hitherto taken a year to effect.

The skins are given, as usual, to the workman, who places them in a bath of fresh water to remove the saline secretions they contain; then they are immersed in a solution of lime, which destroys the hair, and removes the flesh, &c., in the space of ten or twelve days. Then the skins are evenly pared; after these ordinary operations are completed, the inventor prepares his solution of *divi-divi*, of a strength proportional to the thickness of the skin placed in it; for example, hides for soles, eight and forty hours; calf skins, four hours. After this operation they are perfectly tanned, and fit for sale. If it be desired to obtain skins with their hair on, it is sufficient to treat them directly with a solution of *divi-divi*, which tans them in two days. This process is applied principally to knapsacks.

Thus, in the course of a fortnight, a remarkable economy of time is realized, without depriving the skins of their suppleness, elasticity, beauty, or other qualities derived from a prolonged immersion in tan vats.

A very good kind of beer may be made with hops and acorns. In a vat holding 40 or 50 gallons, macerate about 30 gallons of acorns, quite ripe, round and heavy, as little germinated as possible, and quite clean. The water is renewed every three or four days. The acorns, only, are then put into a cask, and six pounds of hops are added. Then it is filled with water. The bung-hole must be covered but not tightly corked, on account of the fermentation that sets up. Fifteen or twenty days after being put into the cask the beer is fit to drink. The cask can be filled up with water as fast as the beer is drawn off. A 40-gallon cask of this preparation will supply the consumption of four or five persons for eight months; the cost of which, at the average price of hops, will not exceed ten shillings.

Man feels himself slighted by Nature, because she has not given him a tail, like other animals. But we were lately assured by travellers that a race of tailed bipeds existed somewhere in Africa. But the doubts such a statement excited have been dispelled by M. Lejean, who is now travelling in Eastern Africa. He finds that the presumed tail is nothing but a singular ornament which the Ngam Ngam add to their belts, so as to make it appear a continuation of the vertebral column. They wish to make up for what they consider a defect of nature. This caudal appendage is somewhat like the tail of the buffalo, about the thickness of the finger, with a fan or tuft at the end. A similar appendage is worn by some of the tribes of North American Indians, a veritable buffalo's tail. As the Ngam Ngam form one of the most savage tribes of Eastern Africa, Europeans have never attempted to travel in their country. According to some accounts they are even anthropophagi, and mercilessly put to death their sick and wounded companions. M. Lejean is in possession of one of these Ngam Ngam tails, and ere long we may hope to see it adorn one of our ethnographical museums.

A remarkable surgical case, involving no less than the complete reproduction of a bone of the leg, has lately excited a high degree of interest. M. Mollet, a surgeon, was called upon to reduce a fractured leg in a young man, about four-and-twenty hours after the accident; he had been crushed under a heap of stones. The entire limb was contused and inflamed. Fragments of the tibia had torn the muscles and the skin, protruded through, deprived of their periosteum. The wound extended from the middle of the leg to the knee. These unfavourable conditions precluded the idea of amputation, so that the surgeon's efforts were limited, provisionally, to the reduction of the fracture. Gangrene removed the most contused parts, and sloughing set in at various parts of the leg. In fact it was impossible to imagine a more hopeless case. Nevertheless, the surgeon having every confidence in the powers of *nature*, patiently watched the issue. At the expiration of fifteen months the limb was almost healed; the bone of the leg was renewed with all its original strength, solidity, and form.

Hot-Water Process.

Manchester, November 5, 1860.

Dear Sir,—In your impression of Friday last I find a letter from Dr. Ryley, headed "The Hot-Water Process." I little thought I should get into *hot water* for simply helping my brother photos here. I can assure you, and also Dr. Ryley, that I had not the least knowledge of the communication referred to in No. 8 of your Journal; and now, sir, I suppose the best way for me to quiet the surprise of Dr. Ryley will be to admit his claim to priority of "dipping an albumenized plate into hot water."

But, sir, I would, at the same time ask you, do I, by this admission, also give up the claim to having succeeded in the manipulation of dry plates by that method, as on reference to his article in the Journal, I find that he admits having failed, owing to stains, while, on the contrary, I succeeded, mine being quite clean and free from blisters?—I am, sir, yours respectfully, John Parry.

[As we stated in a note to Dr. Ryley's letter, we believe he does not dispute that Mr. Parry's use of hot water for the purpose indicated was an independent discovery. We believe Dr. Ryley subsequently discovered the cause of the defects he at first encountered and was able to remedy them. Photographers are not the less indebted to Mr. Parry for the publication of his successful experiments in this direction, which will, we believe again call attention to a subject, which before being connected with some want of perfect success was overlooked or forgotten.—Ed.]

Proceedings of Societies.

London Photographic Society.

This first meeting of this society after the summer recess was held at King's College, on the evening of Tuesday, Nov. 6th. Sir Frederick Pollock, the Lord Chief Baron, occupied the chair. There was a good attendance of members present.

The minutes of the previous meeting having been read and confirmed,

The Chairman briefly congratulated the members on having secured, for their meetings, the room in which they were then assembled, and in which he now had the honour, for the first time, to meet them. The rooms at Coventry Street, which the society had given up, were expensive, and had turned out not attractive. He called attention to many beautiful specimens of various improvements in photography which had been forwarded by Messrs. Joubert, Pretsch, Thomas and others, remarking that he for one would be more frequently tempted from his hermitage to the meetings of the society by the anticipation of a sight of specimens so full of beauty and interest.

Mr. John Scott, of Pall Mall East, Mr. Russell Gordon, of Madeira, and Mr. Plumptre, of Kirby Lonsdale, were elected members of the society.

In the absence of Mr. Rothwell,

The Secretary read some extracts of a paper, "on the apparently incorrect Perspective of Photographic Pictures produced by Lenses of different focal lengths, as usually viewed or looked at, which may be considered as a kind of apparent Distortion:" described as "by J. Rothwell, Inventor of the method of constructing Photographic Lenses free from Distortion." The paper consisted chiefly of a series of mathematical propositions, intended to be illustrated by diagrams. These illustrations were, unfortunately, not forthcoming, so that the paper was robbed of its chief scientific interest and value. Many of our readers will regret this the less when we state that the paper, although interesting in a scientific point of view, was not of a character to popularise or render familiar the subject on which it treated. Probably the absence of the illustrative diagrams may account for the entanglement and misapprehension which characterised much of the succeeding discussion—which at one time seemed to tend towards a reconsideration of some of the most elementary principles on which linear perspective is based, and an enquiry as to whether receding parellel lines did or did not appear to converge, or possess a vanishing point.

We subjoin a brief abstract of such portions of the paper as may show its purport, and are intelligible without the theorems and diagrams.

The paper commenced by remarking that it was a common remark by people that such-and-such objects were too large or too small, and the answer generally was, "that it is only imagination; it is correct, and cannot be wrong: it is impossible." But he thought he should prove that almost all photographic pictures are more or less incorrect apparently.

He proposed to treat the above subject under three heads:—

1st. The apparent enlargement of objects approaching the margin, and diminution of those about the centre of photographic pictures produced by lenses of short focal lengths, by which he meant those under 12 or 15 inches; and, on the contrary, the apparent enlargement of objects about the centre, and diminution of those near the margin, produced by lenses of long focus—those over 12 or 15 inches.

2nd. The apparently excessive enlargement of *near* objects, and extraordinary diminution of *distant* ones.

3rd. The monstrous enlargement of objects approaching the margin, caused by those objects being out of focus, in addition to that caused by their being situated in the margin, as demonstrated under the first head.

He was supposing the lenses to be without distortion on his principle, as illustrated in a paper read before the Photographic Society by J. H. Dallmeyer, Esq., optician, and not the common view-lens, or portrait combination, which would further complicate the matter by their distortion.

In the first place he asserted that in looking at all photographic pictures, to be seen in correct perspective, the eye must be placed at the point where the aperture of the spot was when taking the picture.

It was an incontrovertible truth in optics that the *angle* under which an object in a picture was seen, to be correct, must be exactly the same as the angle under which the object itself was seen in the natural view, whether that object were a near or a distant one.

The paper proceeds to elucidate these points by stating his propositions, and then says: "By the foregoing synthetic course of reasoning, I have demonstrated indisputably that all photographic pictures, particularly those taken with short focuses, when looked at from a greater distance than the focal length of the lens with which the picture was taken, appear under incorrect perspective, that is, the marginal objects appear too large and the central ones too small; and, on the contrary, it is also evident (which can be proved) that when any photographic picture is viewed from a shorter distance than the focal length of the lens with which the picture was taken, the central objects will appear too large and the marginal ones too small. The general conclusion to be deduced is, that it is not advisable to include a wide field with short focus lenses, except in taking groups in some cases, and in which the operator has not sufficient distance to place his camera. But in taking pictures with long focuses (12 inches and upwards) there is no objection to including the widest field possible, because a picture taken with a twelve-inch focus will be of such size that, to look at all the picture at once, it will be held at least that distance from the eyes, and therefore appear correct; and so on with longer focuses, and larger pictures.

"2nd. The apparent enlargement of near objects and diminution of distant ones.

"I have two (what I conceive to be satisfactory) explanations on this subject. The first is, that near objects, in the majority of views, are situated near the margin, and distant ones in the centre, and if the picture has been taken with a short focus, I have demonstrated in the three preceding propositions that in this case, that is, when the near objects are in the margin, those near objects will appear too large, not because they are near, but in consequence of being in the margin, and that the distant objects, being in the centre, will seem too small.

"The second explanation is an optical illusion, which I will elucidate presently.

"I believe that it is a universal practice with all photographers in taking views—yes, and groups too—to so arrange matters as to have near objects about the margin, and distant ones about the centre, if possible. Why? Every photographer knows why,—simply by so doing to get everything in good focus, in consequence of the curvature of the image; and from this practice and what I have previously demonstrated, the majority of pictures have the evils the causes of which I have made manifest in this paper.

"The second explanation, the optical illusion, is that the eye, when looking at a distant object, has not, at the same instant, a clear impression of a near object, because of that near object being out of focus in the eye; the result of which is that we do not get a strong, clear, or correct notion of the comparative sizes of near and distant objects at the same instant. Suppose two poles of equal lengths, both in the centre of the view, one at 10 yards distant, the other at 40 yards. If we look at the near pole, the eye accommodates itself to that distance to bring it into good focus,—*i. e.* clear sight; but, by so doing, it puts the distant pole out of focus, makes it indistinct, and *vice versâ*, by looking at the distant one: and our notion of the comparative sizes of the two poles is acquired by looking first at one pole and then at the other. But in looking at the images of the poles in the picture, the case is altogether different, for there the images are both the same distance from the eye (being both in the centre); and, in consequence of this, the eye gets a distinct view of both at the very same instant, whereby, and for this reason, we are struck with the comparative—apparently excessive—unnatural great difference betwixt the sizes of the images, or pictures of the poles.

"From this explanation of this optical illusion, it is manifest that it is immaterial in what part of the picture the poles or other objects are situated; but when the two causes are conjoined, as in the picture of a long street-view, then it requires both the first and second explanation to account for the very great and apparently incorrect perspective. In the case of a picture having a near (large) object in the centre, and distant ones receding towards the margin, the apparently incorrect perspective of such a picture is, to some extent, corrected by the same causes which produced the bad perspective in the case under propositions 2 and 3, and what remains so uncorrected is readily explained by optical illusion. The apparently incorrect perspective of the picture of a long row of houses standing obliquely across the picture is easily explained by the first and second explanations together; for the near end of the row appears too large, because it is in the margin, and the farther end seems too small, by reason of optical illusion, although it is corrected to some extent by being in the opposite margin; for, if we look at the farther end, we do not see, at the same instant, the near end clearly, and *vice versâ*; but, in looking at the picture, we take in the whole view of it at once, and then occurs the optical illusion.

"Under this head, too, I may refer to the case of the great—shall I say hideously deformed?—images of objects (the objects themselves not being in the same plane) produced by placing the camera very near those objects when taking them, whether using long or short focuses. The worst features of this case occur, almost universally, when taking a single portrait—that is, a portrait of one person." After some further illustrations on this subject, and on "the shocking bad perspective of vertical near objects, especially tall ones,—such as high square towers being converted into the frustums of quadrilateral pyramids, buildings apparently tumbling into streets, &c., &c., caused by what is commonly called 'cocking the camera,'" the writer concluded by saying "that a photographer was surrounded, as it were, with numerous evils in connexion with his lenses and mode of operation, and it had often been remarked, in relation to lenses, that, "if you gain one advantage, you lose another," and so it was; and in this paper his object had been to show the causes of some of those evils, and to enable the photographer to avoid them as much as possible, thereby to obtain the best and most correct results.

Mr. Shadbolt said it had been epigrammatically remarked that nothing was so false as facts except figures. It was, however, not either the facts or figures which were really false, but the deductions which were frequently based upon them, and it was to many of the deductions in Mr. Rothwell's paper he took exception. He then proceeded to examine the propositions and the conclusions deduced from them in detail; in regard to some of which Mr. Rothwell's own statement contained their refutation. In regard to the invention for the prevention of distortion, which was referred to at the head of Mr. Rothwell's paper, he regretted that Mr. R. was himself not present that they might have learnt from him exactly what it was he claimed. He presumed he claimed the insertion of a diaphragm between the lenses. He was in a position to prove that this point was claimed by a gentleman at Liverpool, who worked with it in the early days of Daguerreotype. He believed that in the year 1851 he saw a lens so constructed in the possession of Dr. Diamond. Opticians knew that in a double combination the diaphragm must be placed there. If the point claimed by Mr. Rothwell was the same as that claimed by Mr. Sutton, in which it was stated that the front and back lenses of the combination should be identical, he was ready to dispute it. He concluded by stating that notwithstanding the errors of deduction in Mr. Rothwell's paper, he was obliged to him for the clear mathematical elucidation he had given of some points previously known, but which were not familiar.

Mr. Shadbolt went with considerable scientific minuteness into some of the questions in the paper; but as some of his statements were the subjects of much misapprehension, which gave rise to considerable discussion, chiefly growing out of this misapprehension, the demands upon our space preclude our reporting it at length.

The Chairman made some remarks to prove that a single eye was capable of adapting itself to distant and near objects, a fact which he had understood Mr. Shadbolt to deny.

A conversational discussion then arose out of some remarks made by Mr. Sebastian Davis on the apparent convergence of perpendicular parallel lines. In other words, that there should be a vanishing point for perpendicular as well as for horizontal lines when represented in perspective, and therefore the delineations given by lens, which exhibited an elevated object having parallel sides with converging perpendiculars, was not in itself to be condemned as a distortion. The Chairman remarked that if four perpendicular lines were drawn a given distance apart, and placed at east, west, north, and south, there was no doubt that they would appear to meet in the zenith if they were visible so far.

Mr. Shadbolt said, in regard to the power of one eye, he had merely stated that the eye was unconscious of any adjustment. It did make an adjustment for focus, but could not judge of distance, and quoted a familiar experiment in which a person was asked to close one eye and then snuff a candle. The attempt to do so would be almost certainly a failure. In regard to the Chairman's statement that four lines rising perpendicularly from a large plain would meet in the zenith he must beg to differ.

The Chairman: There is no doubt of it.

Mr. Shadbolt begged to remind the Chairman of a very simple axiom in Euclid, to the effect that parallel lines could never meet even if extended to infinity.

The Chairman said they would appear to meet if they were visible at a sufficient distance.

Mr. Shadbolt said if the poles or lines were visible at that distance the space between them would be still more visible.

A general discussion of a somewhat curious nature followed, in which it was clear that much misconception of each other's meaning existed amongst the speakers, and it might have been fancied that the apparent convergence of receding lines was a doubtful point in perspective.

Mr. Hughes endeavoured to recall the discussion into a practical channel by some remarks on the importance of lenses of long focus for the prevention of distortion. He thought, however, that in speaking of twelve inches as a normal focus, Mr. Rothwell should at the same time have stated the diameter of the lens, and the size of the stop, as the focal length should depend entirely on the size of the lens and the stop used with it. Twelve inches, for instance, would be an enormously long focus for a quarter-plate lens, and very short for one of which the diameter was four or five inches. The size of the lens and its focal length ought to bear a proper relation to each other. He believed it was a common fault to take large pictures with lenses of too short focus. He would recommend photographers generally, wherever it was practicable to take quarter-plate pictures with half-plate lenses, half-plate pictures with whole-plate lenses, and so on, a plan which was converse of what was often attempted. Referring to the central diaphragm in double combinations, he remarked it was a very old practice indeed, and quoted a reference to it from an old American Photographic Journal of a date earlier than 1850.

Mr. Malone made some remarks on the folly of taking a photograph at all under conditions, which from the point of view, must necessarily render it distorted and inartistic. In regard to the question of the convergence of parallel lines he thought there must be some mistake, and it was only fair to ask Mr. Shadbolt if he did not admit that receding parallel lines appeared to converge.

Mr. Shadbolt was glad Mr. Malone had asked him that question. Parallel lines did appear to converge if the plane of delineation were placed at an angle to those lines; but if the plane of delineation were parallel to the lines they would appear parallel.

The Chairman now called attention to the specimens on the table consisting of some burnt-in enamels on glass by M. Joubert; some fine specimens of a new process in which the principles photography and electrotypy are combined to produce a block for surface printing, by Herr Pretsch; some reproductions by Mr. Thomas; some photographs by Mr. Barnes, with an enamel surface like French polish, and some large and very fine photographs by Mr. Dallmeyer.

In reference to the latter the Secretary read a letter stating that they were produced by his new achromatic triplet lens for which he claimed freedom from distortion. He thought the specimens would be interesting on the occasion of a paper from Mr. Rothwell who, as was well known was the first to draw attention to the subject of distortion as produced by the various forms of lens generally used in photography. The lens with which the pictures were taken had a focal length of about eighteen inches and consisted of three achromatic combinations, the front and back were "positive," the former 2⅛ inches, the latter 3¼ inches in diameter, between the two were situated an achromatic "negative" combination of 1½ diameter; each of the three had its contact surfaces cemented, and the total number of "reflecting" surfaces did not therefore exceed those of the portrait lens. With the whole aperture (1¾) the lens covers a plate 10×10 equally illuminated to the corners. With 1 in. aperture it covers a plate 12×12, with ⅝ in. stop a plate 15×15 was covered. When the "negative" combination was removed the focal length of the lens was reduced to eight inches, and worked in about the same time as the ordinary half-plate portrait lens, and covered a similar field, which was not, however, quite so flat.

Mr. Malone then read an interesting communication on printing positives by means of the electric light, (See page 325), and another brief communication on some experiments which seemed to solve very clearly the question of "bottled light," as the source of M. Niepce's mistake appeared from these experiments to be very clearly pointed out. (See page 329).

Mr. Eliott asked if the result of Mr. Malone's experiments were a negative or positive.

Mr. Malone described the result, which he said partook of the character of both positive and negative.

Mr. Hardwich asked if Mr. Malone had not in some instances found the effect produced spontaneously, that was, without development with gallic acid. He had understood Mr. Malone on one occasion to say so.

Mr. Malone did not remember.

Mr. Vernon Heath said that he had a Duboscq's lamp and had some years ago tried similar experiments to those described by Mr. Malone; but it was a most expensive and troublesome affair. Some mention had recently been made of Professor Way's light for photographic purposes. In that fifty cells of Grove's battery were used, which made it still more expensive. He did not wish the notion to go forth to photographers that all they had to do was to go to the expense of a Duboscq's lamp to enable them to print their photographs; they ought to be well apprised of the expense.

Mr. Malone said he had distinctly mentioned that it was expensive; but he had added, what all professional photographers well knew, that there were many occasions when half a guinea or a guinea extra expense would not be an object to secure a portrait where time was important, and it was impossible to have sunlight. A charge of acid he believed for forty cells of Grove's battery cost about ten shillings; that would work for two hours, and four pictures might be printed at the same time. Notwithstanding the expense, he had no doubt that many photographers would be glad to know that such a resource was open to them on emergency.

Votes of thanks to the contributors of papers and specimens were passed and the proceedings terminated.

City of Glasgow and West of Scotland Photographic Society.

The second ordinary monthly meeting for the season of the City of Glasgow and West of Scotland Photographic Society was held in the Religious Institution Rooms, on Thursday, the 1st of November, J. Kibble, Esq., the President, in the chair.

Mr. Ewing read a paper intitled "Remarks on Failures in the Albumenizing, Printing, and Toning of Positives on Paper," and illustrated by various specimen prints showing failures commented on. On concluding the reading of the paper Mr. Ewing sat down amidst continued and enthusiastic applause.

A conversational discussion for about three-quarters of an hour ensued.

The Chairman remarked that the cause of the measly appearance in prints was the use of too weak hyposulphite, causing the formation of sulphuret of silver. That the brown spots were sulphuret of silver, and that no amount of after washing or immersion in hypo would dissolve them.

Mr. McFarlane showed prints having the two kinds of disease which at last meeting were designated measles, the numerous small red spots on the surface, and which all now agreed was on the albumen; and the brown spots or patches best seen by transmitted light, and which he thought were caused by too weak hypo, as now explained by the Chairman.

The Chairman showed some small pieces of paper which had become spotted by being kept in a damp place. A small piece of the paper on which he printed his 40-inch pictures showed these numerous transparent spots very evidently.

Mr. Hugh Wilson directed the attention of the meeting to the getting of what the engraver would call a metallic surface on the paper before printing on it.

Mr. Stuart explained that he had recommended that in his paper read at last meeting.

Mr. Wilson said he proposed it at a former meeting.

Mr. Ewing said he believed neither of them were the original proposers of this simple matter.

Mr. Stuart showed a print produced on the paper enclosed in the preservative case at last meeting, but having been two days in printing it could scarcely be considered a fair example of what the case would do.

The subject of printing was again continued for next meeting, on the first Thursday in December, Mr. A. M'Nab to lead off.

The Chairman then read a short paper on some experiments he had made in reference to Messrs. Petschler and Mann's process, and showed the various pictures referred to in his paper. He concluded his paper by proposing that the thanks of the Society be awarded to Messrs. Petschler and Mann for the unreserved manner in which they had given their discovery to the world.

The Secretary then intimated that he was deterred by some business requirements from referring at last meeting to his safe return from the Holy Land, but would now take the opportunity of proposing that the thanks of the Society be given to Mr. J. Spencer, jun., for his faithful discharge of the duties of secretary during Mr. Cramb's absence.

The thanks of meeting were then given to Mr. Kibble, and to Mr. Ewing for their papers.

Photographic Notes and Queries.

India-Rubber Solution.

Glasgow, Nov. 6, 1660.

Sir,—Your correspondent, Mr. Charles Eades, Chemist, Birmingham, will oblige myself and others by giving the relative proportions of india-rubber and bi-sulphate of carbon, as referred to in last number of Photographic News.

As the bi-sulphate of carbon is of a disagreeable smell I tried strong benzole for dissolving india-rubber, but failed. Can this be helped? Yours truly, Glasguensis.

[Benzole ought to have dissolved your india-rubber, as it is considered one of the best solvents of that material. Sometimes the aid of heat facilitates the process.—Ed.]

Miscellaneous.

Poisoning by Cyanide of Potassium.—A correspondent of the *Scientific American* referring to the antidotes for this poison, says, "The sesquioxyde of iron readily combines with the cyanide forming prussian blue, which is comparatively harmless. A solution of proto-sulphate of iron, or the common sulphate, will also unite with the cyanuret, but not so perfectly. Electro platers have also informed me that green tea was also an antidote; I have never tried this, and do not know anything about it. Photographers generally use cyanide of potass to reremove silver stains from their hands, and it frequently causes bad sores. When experimenting, I have used these solutions of iron to wash my hands after using the cyanide, and found them successful. Chloride of zinc will also remove the silver stains, and is, I think, much safer." The editor adds, "The difficulty of administering an antidote for cyanide of potassium results from the instantaneous suddenness of its action. We knew a German photographer of this city who, one day meeting with some unexpected difficulty in cleaning a glass plate, became suddenly transported with passion, and, in his madness, dashed the plate on the floor, and seizing a vessel of cyanide of potassium, poured it down his throat. He dropped as if he was shot, and died in half a minute.

Chemical Activity of Light. — The experiments of American and European investigators have recently disclosed some beautiful truths respecting the laws of light, wich will be of no small utility in agriculture, photography, and other arts. One point which is at present attracting some attention is the discovery of some exact method for the measurement and registering of the precise amount of force exerted under different conditions by the actinic rays of the sun. In photography, the establishment of accurate means of measuring the chemicallyactive rays will be a step toward attaining a deeper knowledge of photo-chemical processes, ot the natureand fundamental laws of which, notwithstanding the great progress of photographic art, we know as yet so little. By the use of the chemical photometer, the amount of actinic light which emanates directly from the sun, has already been measured with approximate accuracy. Repeated experiments seem to show that at two different times on the same day the rays contained in direct sunlight are capable of producing equal chemical effects. These periods occur when the sun is at the same height above the horizon, the sky being cloudless. Thus the chemical power of direct sunlight at 9 A.M., and at 3 P.M.; at 11 A.M., and at 1 P.M., is the same. The chemical action due to diffused daylight has also been subjected to similar measurement, and the amount produced at an equal distance before or after mid-day is found to be the same. These conclusions hold good only where the sky is free from clouds. Photographers working in covered rooms which have various aspects, must naturally arrive at totally different results. The laws regulating the variation of the photochemical intensity of direct and diffused solar light with the height of the sun above the horizon, afford us the means of arriving at several interesting facts. For instance, it appears that wherever upon the earth's surface the sun does not rise beyond a certain height, the actinic power exerted by the total diffused light is, during a part of the day, greater than that produced by direct sunlight. When the sun rises beyond this hight the direct sunlight has more chemical action than the total diffused daylight; and between these situations there is a time when the chemical energy of these two sources is equal. This point is called "the phase of equal chemical intensity." A simple and accurate method is much needed for registering the daily and yearly variation of chemical light poured from the sun over the earth. The science and art of photogrophy would thus be advanced, and a novel and interesting field would be opened to meteorological research. Dr. Draper, the professor of Chemistry in the University of New York, has made several highly important discoveries in this department of scientific investigation.

Talk in the Studio.

M. LEGRAY, THE CELEBRATED FRENCH PHOTOGRAPHER, has met with a sad accident in Syria. He was with a French expedition, on a professional excursion, and Fuad Pacha had given him an escort of an officer and fifty men, under whose guard he proposed to take views in the mountains; but when near Damascus he received a kick from the horse of the French envoy, which broke his leg. By the last accounts, however, he was going on well, and had not given up the hope of bringing home some reminiscences of his journey in strange lands.

PHOTOGRAPHIC MINIATURES IN OIL.—The miniature cases in which these are frequently placed should be left open and exposed to light, otherwise they will become horny and discoloured. For want of this hint we have just seen a very beautiful and costly picture utterly destroyed.

UNITY IS STRENGTH.—Having an interest in common with most of our readers in the real progress and welfare of art, we cannot resist giving the rival institutions known in Liverpool as the "Academy of Arts" and the "Society of Fine Arts" this hint, viz., that their present disunion and active jealousy may bring about the destruction of both, as Liverpool, ably competent to support the one, may not, probably, be as able to retain the two.

KENSINGTON PICTURE GALLERY.—Four new pictures have been lent for exhibition by Mr. James Bell, painted by Sir Edwin Landseer, E. W. Cooke, Frith and Collins. Several important additions from Italy have also been announced, chiefly in the way of sculpture.

A HINT TO SIGHTSEERS.—Mr. Cole, who superintends the South Kensington Museum, made a curious statement in the course of his evidence recently before the British Museum committee. "We find," he said, "that the mere exhibition of pictures to great multitudes exposes them to accidents which would hardly be dreamed of. The public sneeze upon the pictures, and the saliva runs down, and positively eats away the surface of them. One of the most valuable of Mr. Mulready's pictures was covered with the coughings and the sneezings of the public looking close at the picture, and laughing in the presence of it. We have great difficulty in preventing them expressing the emotions they feel in looking at a picture, and they will touch it; they say, 'Look at that expression;' and the consequence is that they scrape off a little bit of the pigment. We have come to the conclusion that pictures within reach must be put under glass. We have already the experience that glass keeps pictures much cleaner. We all know, that though the public is gradually becoming very well behaved, and is well behaved, still they very much like to touch things. We had a little bit of sculpture, a mother and baby, and the baby excited the interest of all the mothers that came to the museum; they were always measuring their babies by the side of it, and touching it, till it became quite grubby. It happened to be only a cast, but precautions must be taken to prevent things being damaged."

PHOTOGRAPHIC SURFACE PRINTING.—Herr Paul Pretsch, the discoverer of the process of photogalvanography, has recently made some further discoveries, by which photographic pictures are reproduced by the electrotype process, with a surface in relief, and may be printed in the usual manner of letterpress printing. All previous processes of photographic engraving have, we believe, been in intaglio, and printed like engraved plates at the copper-plate press.

SOUTH LONDON PHOTOGRAPHIC SOCIETY. — The monthly meeting of this Society occurs early this month. It will be held at the School-room in connection with St. Peter's Church, Walworth Road, on the evening of Thursday next. A paper on the Positive Collodion Process will be read by Mr. Hervé, and some account will be given, we believe, of the labours of the Experimental Committee in connection with the Dry processes.

OBITUARY.—A. E. Chalons, one of the oldest members of the Royal Academy, died at his residence at Kensington on the 3rd of last month, aged eighty years. He was elected in the year 1816, and was appointed "Portrait Painter to Her Majesty." His works are in water colours, but being excessively mannered, were not, although very frequently engraved, very popular.

E. LANDELLS, the well-known engraver, also, is no more, having died at the age of fifty-three.

To Correspondents.

L. L.—The decreased density of negatives after fixing generally arises from the presence of organic matter in the film, either derived from the bath or the collodion. To avoid it, develop considerably further, and use a weaker fixing solution. The use of hyposulphite of soda for fixing, instead of cyanide of potassium, will frequently be found an advantage; but in that case wash very thoroughly after fixing. You may intensify after fixing, if your negative does not appear sufficiently dense, by pouring on the plate a solution of iodine, and in a short time wash and develop again with pyrogallic acid and silver. See article on the subject in the forthcoming "PHOTOGRAPHIC NEWS ALMANAC."

A CONSTANT READER.—The meetings of the Photographic Society of London, during the present session, will be held at King's College. Beyond that, the Society will not have a local habitation. The rooms at Coventry Street were given up at Midsummer, as too expensive.

T. W. S. B.—We are not aware of the existence of any book on this subject, if we should hear of it we will mention it in a future number.

LUX.—The address of Mr. Bennett, publisher of Sedgefield's Views, is 5, Bishopsgate Street.

N.—All new vessels of gutta-percha require cleansing before use from grease which used in moulding them. A strong solution of soda or potash, or a strong solution of cyanide of potassium should be left in them a short time, and after washing with a few changes of water, rinse with dilute nitric acid and finally wash well. Pure gutta-percha is of course quite insoluble in water, and without effect on most solutions used in photography. We used a nitrate of silver bath purchased from the firm you mention for years without inconvenience.

M. B. JOYE.—We have not tried the resin preservative process, but have repeatedly heard good accounts of it. Add two or three grains of good resin, powdered, to each ounce of collodion. Excite in a strong and somewhat acid bath. Wash well, drain, and dry. After exposure, which need not be long, as the plates are very sensitive, wet the plate thoroughly with distilled water, redip in the nitrate bath, and then develop with pyrogallic acid as in wet collodion. A few experiments will doubtless enable you to practise it with success. We believe the process was first suggested by the Abbe Despratz.

N. W.—In preparing proto-nitrate of iron by means of proto-sulphate of iron and nitrate of baryta; an interchange of their constituent parts takes place called "double decomposition"; the nitric acid leaves the baryta and combining with the protoxide of iron forms the proto-nitrate of that metal, and the sulphuric acid which leaves it combines with the baryta forming sulphate of baryta, which is insoluble in water. This is the white deposit about which you enquire; it will always be formed; and must of course be filtered out. The remaining apple green solution is your proto-nitrate developer. A full proportion of nitric acid for a positive bath of thirty-five grains to the ounce, would be one drop of nitric acid to each ounce of the bath. It is best to add it in much smaller proportion at first and try the effects, adding gradually until you get the result you require. The "objectives" you name we have not personal knowledge of; but the firm is a respectable one. The collodion you name we have used and obtained with it some good results; but it is not always an easy collodion to work: we prefer one with more body.

STRATFORD.—We do not know of any method of ascertaining when the copyright of an engraving has expired, except by ascertaining the date when it was published, either of the publisher himself, of some one familiar with the trade, or at the print-room of the British Museum.

NIMROD.—The chief faults of your specimens lie in the posing, which lacks ease and grace. A little more vigour and brilliancy are also required. Do not use a white background, it is inartistic and unpleasing. You will see an announcement in our advertising columns from Mr. Wall. Communicate with him.

W. C.—Mr. Hughes, of Oxford Street, is, we believe, making arrangements for a supply of arrowroot paper. We do not know at present of any other person who keeps it.

A TYRO.—There is no distinct work devoted to the subject. You will find the best information in various previous numbers of the PHOTOGRAPHIC NEWS. If you have them not, we can point out some specific numbers containing articles on the subject.

EXCHANGE OF LARGE PICTURES.—J. T.—We will print a list of names shortly if a sufficient number of members communicate with us. At present we have not received many.

K. D.—Your failure appears unaccountable. Try another collodion and wash more carefully.

E. B. N.—Unless your collodion be very old indeed, so as to have become decomposed, the fault is probably elsewhere. Perhaps your bath contains organic matter: in that case it will be difficult to obtain positives with good whites. Without seeing the pictures we cannot give a certain opinion. Old positive collodion generally gives good whites; but bad half-tone.

S. R. G.—Your stereographs are far from worthless. Some further remarks in our next.

HYPO.—Your prints are very much under-printed, and the negatives apparently deficient in vigour. Try a more intense negative, and print very much deeper. The highest lights should be of a faint lavendar tint before the prints leave the pressure frame. Is your silver bath the full strength? Remember, use rapidly weakens it.

W. W. J.—We are not familiar with the instrument you describe. We will consider your suggestion; but as we frequently have difficulty in finding space for all we deem of absolute and direct interest to photographers, we fear that we shall not be able to spare space for another, although cognate, branch of science.

All Letters, Works for Review, and other Communications for the Editor, should be addressed to the Office, 32 PATERNOSTER ROW, LONDON.

THE PHOTOGRAPHIC NEWS.

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CARBON PROCESSES AND THEIR INVENTORS.

We received a few day's ago, "with J. Pouncy's compliments,' a printed extract from the *Dorset County Chronicle and Somerset Gazette*, from which we learn, with no little amusement and surprise, that the beautiful and successful process of photo-zincography, as published by Col. Sir Henry James, is not the discovery of that gentleman, but "has been avowedly taken from Mr. Pouncy;" and furthermore, that M. Joubert's process of permanent printing, notwithstanding that every particular regarding it is at present a sealed secret, is really due to Mr. Pouncy, of whose process this is but a modification. In short, it is implied that the discovery of bichromate of potash, in combination with organic matter, as a photographic agent, is due to Mr. Pouncy, who "was little other than concussed to reveal and surrender it for the most inadequate consideration:" this consideration being £80 collected for him through the agency of Mr. Sutton. Having assured his readers that "the Southampton process is throughout nothing else than that long previously pursued in Dorchester," our provincial contemporary proceeds:—

"It is not alone in this country, however, that Mr. Pouncy has had his brains sucked. Our readers are aware that he has been competing, for the honour of his country, and of his discovery, in France, and pending the award of the Duc de Lhuynes' premium of 10,000f., for the best process of carbon-printing, an intermediary medal and prize of 400f. have been conferred upon him by the Photographic Society of Paris. To this circumstance we presume is due the appearance in the field of M. Joubert, a French gentleman of apparent means, who nevertheless expresses his willingness to publish the particulars of his printing process for a sum of money."

And again:—

"Well then, is one gentleman to be knighted, another to be subsidised, are the workshops of the world to get a novel and animating impulse, whilst the *fons et origo* of the improvement continues to stagnate in the isolated town of Dorchester? Not that Mr. Pouncy has remained still. We know him better, and believe, that, step for step, he has done whatever others have done in developing the facilities afforded by his art; but the treatment he has met with has not warranted him in farther opening his mouth. It is not without grounds that we now add our conviction that we have made out a clear case entitling our neglected fellow-townsman to public notice and encouragement."

Now, we should very much have preferred to have left these remarks to the limits of a provincial publicity, nor should we have deemed the editor making them, guilty of very culpable ignorance, in not being familiar with facts that did not necessarily come under his province to notice. We have, moreover, no wish to take up cudgels in reference to bygone quarrels or misunderstandings with which we had, personally, no connection. We have really no fancy for what a contemporary has facetiously phrased as the "pugnacious aspects" of photography. But as Mr. Pouncy directly challenges our attention, we are bound to remark that this seems in every way a gross misstatement or misunderstanding of the case. Not only was Mr. Pouncy, according to all published evidence, not the originator of the idea on which his own and similar processes are based; but, as all photographers are well aware, the particular application of the idea, of which he was the originator, was revealed simply through the publication of the specification of his unfulfilled patent, and not in any sense because he was "concussed to reveal and surrender" it.

It seems idle at this period of photographic history to remind our readers of familiar facts. It is unnecessary to refer to the original discovery of Mr. Mungo Ponton, by which it was discovered, as early as 1838, that the action of light on soluble organic matter, in combination with certain chronic salts—bichromate of potash was the first, we believe, as well as the latest, tried—was to render such soluble matter insoluble. On this point all subsequent discoveries have been based. M. Poitevin followed in 1855 with a patent for a process of photography, based on this action of chromic salts; and in 1857 M. Beauregard patented a process of printing from the negative, by means of bichromate of potash and gelatine. It is not until the year 1858 we hear of Mr. Pouncy at all in connection with the subject; and then, it is true, we heard a great deal.

Now let us be understood; we are neither undervaluing the labours of Mr. Pouncy, nor denying the originality of his discovery, so far as he was concerned. How far the discovery was due to his own researches, and how far due to the information of others, we have no means of knowing; and we make neither assertion nor conjecture. Nor would we, willingly, in the slightest degree, detract from the merit either of Mr. Pouncy's experiments or their results. That he worked with much perseverance and skill to perfect a process of carbon printing, which, if not entirely successful in itself, at least threw much light on the subject, stimulated the progress of experiment in that direction, and also probably aided, more or less directly, in bringing about the success of others, may be quite true. But that Mr. Pouncy, or his friends for him, should on this account claim to be the originator of all processes of carbon printing, whether on paper direct from the negative, or by photo-lithography or photo-zincography, provided the salts of chromium and organic matter are employed in them—for this seems to be the scope of the claims made—is simply preposterous.

The adequacy of Mr. Pouncy's reward we do not intend to discuss. To the patient and persevering experimentalist by whose unselfish labours the progress of science and of art, and consequently the happiness of the world, is advanced, we do not grudge the highest of the world's honours and emoluments. But we cannot help remembering that the sum of £80, which Mr. Pouncy did receive, were entirely due to the generous efforts of an enthusiastic contemporary, who reaped little thanks and no little ridicule for his pains, and that it is a crowning reward that his advice to Mr. Pouncy, not to expend money on an untenable patent, should be described as "concussing" him to "reveal or surrender" a valuable secret for "the most inadequate consideration."

One word as to the printing process of M. Joubert. We see in a recent number of the "Notes," an intimation that Mr. Sutton is willing to undertake a similar office, in regard to purchase by subscription, for the phototype process as he did for the carbon process. Knowing Mr. Sutton as we do, we scarcely imagine even the novel charge of "concussion" would deter him from an enterprise he believed likely to further the progress of the art. We may remark, however, that we have understood from M. Joubert that he has an invincible dislike to such a mode of remuneration; and we may add that the amount at what he values his discovery, would be a barrier to such an enterprise; as, from his conception of the capabilities and probable results of the process, he regards it as worth £2,000.

POSITIVE COLLODION PICTURES ON GLASS.

BY ALFRED HERVE.*

The following is written with the view of describing a mode of manipulation by which good collodion positives can be produced on glass—being the one I have practised since Mr. Archer first introduced it—having tried every published modification, and made many experiments of my own, but with little success, always having to fall back on Mr. Archer's instructions, with a very few alterations.

The first thing I shall mention will be the bath for holding the nitrate of silver solution, which should be made of glass in preference to any other material. The gutta percha bath is the worst that can be used, because it is almost always adulterated with soluble gums, which are partially dissolved when the nitrate of silver solution becomes charged with alcohol and ether.

To make the sensitising bath.—Dissolve crystallized nitrate of silver in distilled water, in the proportion of thirty-five grains of silver to the ounce of water. To twenty ounces of the above, add half an ounces of highly iodized *new* collodion, shake it well up, and let it stand six hours, filter, and it is ready for use. I have always found a bath thus made sufficiently acid. If any one has a fancy for further acidifying, it must be done with nitric acid; and if on the other hand they wish to neutralize, liquour ammonia will be found to be the best alkali for that purpose, but must be added in very minute proportions. I have never found a bath made in the foregoing manner get out of order till completely used up—that is, when it becomes charged with organic matter imbibed from the collodion. That they do get out of order before their time I am fully convinced, but it is only when in the hands of slovenly manipulators, who do not wash their fingers after each operation.

The best kind of glass for taking pictures on I find to be *hand-polished flatted crown*: it is also very cheap. Choose the smoothest side, and clean with a mixture of equal portions of common whiting and fuller's earth, mix them together with clean soft water until it is about the consistency of cream, let it stand for a minute or two, that the heavier portions may sink to the bottom, then pour the top part off into another vessel, to which add a teaspoonful of common salt. Pour a small portion on the glass and rub it well with a tuft of clean cotton wool, then wash it thoroughly and wipe with a clean cloth. Place them in the plate box with the smooth side towards the left, when they are ready for a final polish, which is best done with a piece of chamois leather, carefully washed in a solution of spirits of wine and water.

The kind of collodion to be used is of the utmost importance—there is plenty of good quality in the market. The main difference between them being that some yield an intense black and white picture with little half tone, while the other produces a more general or flat picture. I always keep three samples, comprising one of each of the former, the third forming a mixture of equal proportions of the two.

Coating the plate is a process requiring some knack, and is best done as follows. With the left hand thumb and forefinger hold the left bottom corner of the plate, pour the collodion on at the right top corner, and let it run to the left top corner, down to the left bottom corner, just escaping the thumb, running it off by the right hand bottom corner back into the bottle. To prevent craping the plate should be rocked to and fro from left to right until the collodion has quite set, then place it on the dipper with the top part of the plate downwards, as the lower part is slightly more sensitive than the top, the lower portion of the figure being thereby better developed. The time for leaving the plate in the bath is about two minutes in the summer and three minutes in the winter, occasionally lifting it up and down; care must be taken to place the plate in the camera slide in the same direction as it was on the dipper.

The time of exposure in the camera depends entirely on the quantity and quality of the light, which varies all day long, and all the year round. When the light is yellow, the time of exposure must be increased very materially as its actinic power is very feeble, particularly in the spring and autumn.

In developing the picture be careful not to pour the fluid on the plate on one spot; but shoot it quickly over the whole of the surface, which requires some practice to do, especially with large plates. The developer I recommend is made thus:—Protosulphate of iron, 140 grains; soft water, 8 ounces; nitrate of potash, 102 grains; glacial acetic acid, 3 drachms; nitric acid, 6 drops (strength of acid varies). For large plates a more energetic developer is required; it stands thus:—Water, 6 ounces; alcohol, 2½ drachms; glacial acetic acid, 2½ drachms; protosulphate of iron, 2 drachms: sulphuric acid, ½ a drachm. This will be found to give a much bolder effect than the first-named. Large plates to be developed should be placed on a pneumatic holder, as they are then more conveniently moved about. Always filter the developer very slowly before using. Place a piece of cotton in the neck of the funnel and filter through it, and if it runs through too quickly push the cotton lower down with a glass stirring-rod. You can by that means make it run as slowly as you please. If the exposure be well timed, the picture will appear gradually; but if over-exposed, it starts out too quickly, and presents a flat, foggy appearance; and again, if not sufficiently exposed, the picture cannot be brought out without over-development; in that case a deposit is left on the film, which entirely spoils the picture. I prefer cyanide of potassium as a fixing agent, because it removes everything that is not necessary to the formation of the picture, and is easily washed off with water. The proportion is of little consequence—say 2 drachms to half a pint.

The Varnish.—For varnishing positives, good chloroform and amber varnish dries the quickest and hardest, it also presents the brightest surface, and if of good quality never cracks.

A few Causes of Failure.—The effect of *under*-exposure and *over*-development is an unsatisfactory black and white picture with fog. Over-exposure produces a flat, dull effect. Light finding its way into the camera causes fogging. Moisture condensed upon the lenses produces the same effect. Dirty glass is also a prolific cause of fogging. Light admitted into the operating-room also causes fog. Care should be taken not to admit the sun's rays into the lens, as that is the worst fogging of all. Putting the plate into the bath before the collodion is set produces marbling. The same effect is caused by removing the plate too soon from the bath. As the plate becomes hot by friction in polishing, let it cool before coating, or curtains and clouds will be the result. Black spots are produced by dust in the dark slide. White spots are produced by dry pieces of collodion from the neck of the bottle. White slugs are caused by undissolved cotton in the collodion. Irregular cloudy patches arise from the developer not flowing freely over the plate, which is the case when alcohol and ether have accumulated in the bath, and is remedied by the addition of spirits of wine to the developer. Lines across the plate are the result of stopping the plate during its descent into the bath. Any dust left on the plate before coating will leave black spots.

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* Read at the Meeting of the South London Society on the Evening of Thursday, the 15th inst.

HOW TO PRINT FROM THE NEGATIVE.

BY R. W. THOMAS.*

In order to print from the negative very little skill in manipulation is necessary; but very much judgment and taste must be exercised in order to produce the best results, if really good proofs are cared for. Many look upon the operation of printing as mere drudgery—beneath notice; this work is frequently feeling for art as the pressure-frame used to produce the picture. Having a first-rate negative, it is quite possible to obtain from handed over to the care of boys and girls, who have as much it proofs of various qualities; so that, it may be, there are not two alike in a dozen prints, and perhaps one of them will be found superior to the other eleven. I admit that a difficulty exists, and one not easily removed; it lies solely in the variability of sunlight in this climate. At first sight it would appear easy enough to obviate this by a watchful examination of the picture whilst printing; such a course gives a proximate notion only of the real state of the print; for, presuming the day be dull, and occasional glimpses of sunshine flit over the printing frame, it will be found impossible to calculate to a degree the amount of reduction that will take place in fixing the picture. If exposed for some time on a dull day without sun, the positive may appear to be very much overdone, and yet be too much acted upon whilst undergoing the necessary immersion in the bath of hyposulphite of soda, in consequence of the greater reducing power of this salt upon proofs printed in feeble light.

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* This paper, with some fine specimens of reproductions, was referred to, but not read, for want of time, at the meeting of the Photographic Society on the 6th ins

I am, of course, taking for granted that there is a shade of intensity to be sought for in the positive picture, which the negative is capable of giving, and which shade shall be acknowledged to be that best suited to the particular subject represented. For the reasons just stated it will be found difficult to obtain this quality at will with a variable sunlight. The natural deduction to be drawn from these remarks, therefore, is that, in order to produce from a negative several copies uniform in quality, it is necessary to print in direct sunlight; one or two experiments will then show the character of the negative: the time required to print from it in order to obtain a special intensity of tone, can be easily noted. I do not now refer to colour; but, by intensity of tone, I mean that amount of force giving artistically the best result from a particular negative: and this leads me to another remark, viz., the quality of the negative; for supposing the same collodion to have been used for the production of a series of negatives of different subjects, the printing peculiarities of each negative will vary according to the subject represented, the colour of which, and quality of the light used to produce the negative, affects its resisting power to stop out rays of transmitted light. It is therefore necessary to be acquainted with the peculiarities of each negative. There is this advantage in printing in direct sunlight,—the subsequent reduction can be calculated to a nicety, whether the negative be faint or vigorous: for, as I have before stated, the positive produced under these circumstances does not suffer such an excessive and variable reduction in the hyposulphite of soda as when a bad or variable light is used. I am, of course, aware that some sort of compromise may be effected by very much over-printing, and then reducing the excess of intensity by a prolonged immersion in the hyposulphite of soda bath. I am by no means satisfied with this plan; the picture then is not of first-rate quality, but hard and inferior in tone and seldom brilliant. Of course, in allowing for the over-printing, it is necessary to lay down a given time for fixing in hyposulphite of soda: I put this at half an hour, and never fix more than one proof in a dish at a time. Now it can be very readily demonstrated that positives printed in a bad light are much more rapidly acted upon by the hyposulphite of soda, as I have before said; nothing, therefore seems so easy of confirmation as this proposition, that in proportion to the acting power of the hyposulphite of soda upon the reduced silver, so will be the action of other external influences of a chemical nature on the picture when finished. To my mind this appears only a plain common-sense view of the case, and the inference to be drawn therefore is, that a greater general permanency is obtained by printing in direct sunlight. These observations may open up a new field for inquiry, and may perhaps account for the variableness in the permanency of photographic pictures. All good negatives should stand sunlight printing; I am certain that a finer definition of detail is obtained, and both a greater richness and brilliancy of colour, when prints are made under these circumstances.

I may as well remark here that a faint negative will under no conditions of light give a fine, rich, and dark-coloured positive; the picture may certainly be cooked in baths of gold and much variety of smudginess produced,—a dead, cold and leaden hue—shades of black fit only to represent scenes in pandemonium. This is the character of colour forced upon faint positives by over-dosing with gold. A well-printed positive of good vigorous colour will stand a longer immersion in the gold-bath, and yet be free from the objectionable colour just described. There is considerable room for display of taste in the selection of shades and tones of colour in photographs, according to the subject represented; the most infelicitous choice is sometimes made. I think that a great deal of the evil is to be attributed to the wholesale and reckless use of gold, which, if skilfully used, is capable of producing every variety of good photographic colour.

I once heard of an amateur who apologized to his friend for the bad colour of a photograph he was anxious to present him with, at the same time saying, somewhat mournfully, "he had expended on it the contents of a 15-grain bottle of gold;" but even then it fell short of some ideal standard of perfection. The doctrine of sunlight printing which I have endeavoured to lay down would, of course, be fatal to general photographic business in this country; it would never do to be waiting upon and otherwise dodging our great luminary; the principle, involved, however, may nevertheless be true, although its practice may be difficult or perhaps impossible. I am now addressing the few who, like myself, are anxious to produce at will a first-rate impression from a negative of good quality. The best toning process is that which is now generally followed, viz. the alkaline chloride of gold process. I use albumenized papier Saxe, either thick or thin—the latter with fine definition is required. Float each piece of paper for five minutes upon a solution of nitrate of silver, 80 grains to 1 ounce of distilled water, and use it as soon as it is quite dry. I have observed that a brighter colour is obtained when the paper is used very soon after excitation: let the paper, however, be quite dry before using it; expose in the frame in the usual way. I far prefer the bars of pressure-frames fitted with screws—the contact is then so perfect all over. In sunlight the time of exposure will vary from ten minutes (the minimum time) to half an hour for ordinary subjects; but a much longer exposure will be necessary for the representation of black and white subjects, such as engravings. Be very careful to examine the print in yellow light, whilst printing: if the frame be opened even for a second or two in daylight, a slight general action of light will take place over the whole surface of the picture. Conduct the operation of toning and fixing in yellow light. When the print has reached the proper intensity (allowing for the reduction) remove it from the printing-frame, and wash away in several changes of common water all the nitrate of silver; when this has been properly effected, prepare the following bath, but not before it is required for use:—

Solution of bicarbonate of soda, 40 minims (8 grains to 1 oz. distilled water).
Solution of chloride of gold 20 minims (15 grains to 5 drachms distilled water).
Distilled water, 4 oz. Mix.

The solutions both of gold and silver may be kept ready for use in separate bottles. I throw away the colouring bath after use. The above quantity will tone half a dozen pictures 10×8, if warm tones only are required; the time of immersion varies from thirty seconds to two minutes. Over-colour the positive slightly, to allow for subsequent reduction in the hyposulphite of soda bath. Now wash away the excess of gold solution rapidly in two or three changes of water, and fix each proof singly in a bath of hyposulphite of soda, 1 oz. to 6 oz. of water. In order to make sure of the picture being perfectly fixed, let each proof remain in this bath for half an hour—not less: then wash it in running water for twelve hours, and let it dry spontaneously. I have a strong feeling in favour of a particular colour for photographs; no word-painting will describe this or any other tone of colour; I shall be happy, however, to show to any one specimens of colouring by the above formula. It is very evident that paper treated and washed as just described, involving an immersion of twelve hours in liquids, must have undergone some alteration in the arrangement of its atoms; these are of course now more open, spongy, and porous, consequently the particles of silver forming the image must of necessity be somewhat divided and less compact than is desirable,—I think therefore more in a condition to absorb deleterious gases, and more susceptible of damage from moisture in the atmosphere, or other injurious influences. It is most desirable to restore the paper to its original condition; this is easily done at a very small charge by the hotpresser. The pictures must not be over-rolled—such an action would be injurious to the surface. I order mine to be rolled flat only; this last operation is, I consider, most beneficial, both as regards the beauty and permanency of the finished photograph.

SCIENTIFIC GOSSIP.

It may be of interest to our experimental readers, if, pending the result of the experiments mentioned in our last number, as being about to be undertaken with a view to test the photographic capabilities of the lime light, we give a short account of some researches on the same subject which were undertaken by Mr. Crookes in 1856, but which have not hitherto been made public. The experiments were undertaken for the purpose of ascertaining whether it would be possible to obtain a portable means of illuminating objects in dark places sufficiently to enable them to be photographed. The problem to be solved was one which had not then been brought much before the photographic or scientific world, and consequently these experiments (which were undertaken by Mr. Crookes at the expense and for the benefit of the Government) were to be of a preliminary character, and were to be limited to such chemical and optical researches as would be likely to show if the chances of ultimate success were sufficient to render it advisable on the part of the Lords of the Committee of Privy Council for Trade, to go to any considerable expense on the subject. The results of this preliminary investigation were very satisfactory, and we cannot help feeling sorry that it was not decided to continue them upon a larger scale.

The two great sources of artificial light, electricity and chemical action, were successively tried, the former, however, not being considered so promising a field for as the latter, owing to the great expense and difficulty attending its use, and for the further reason that the requirements of the case rendered portability a great consideration. Trial was made of the "electric egg," or the luminous glow which is produced when the secondary current, from a powerful induction coil, is passed through highly attenuated gaseous media enclosed in glass tubes. But, although a spectral analysis of this light showed that the photographic rays of light were present in enormous quantities in proportion to the visible rays, they were insufficient to affect a sensitive collodion plate when reflected from an object, removed to any considerable distance.

The light produced when voltaic contact is broken between mercury poles (the progenitor of Way's mercurial electric light) was found to be very intense and to contain much higher and stronger actinic rays than even sunlight: moreover, it was not open to the same objection as was the carbon electric light, as the battery power required would be less, and the motive arrangement at the point of light might easily be rendered automatic. Mr. Crookes was perfectly successful in taking good photographs by this light, but as it was probable that greater success might be obtained at a less expense by directing attention to some other chemical source of light, the experiments in the above direction were discontinued.

The light evolved from the combustion of sulphur, carbon, and phosphorus in oxygen gas was next experimented on, but with the exception of the latter no good result could be obtained with either. Phosphorus burning in oxygen produced such a brilliant photographic light, that if it were possible to devise a safe and convenient apparatus for its production it might doubtless be made available for photographic purposes. Photographs were likewise taken by Mr. Crookes with this light.

An attempt was then made to combine both the combustible body and the source of oxygen together, and so produce a light analogous to those employed for pyrotechnic purposes. Mr. Southby, the well known artist in fireworks, was employed to make several intense lights of different colours, and in convenient forms for experimenting with. These experiments were, however, discontinued, as although the light might perhaps have been obtained sufficiently strong for the purpose, yet the volumes of smoke arising from the combustion proved an insurmountable difficulty; and even could this have been obviated, the results of combustion, such as sulphurous acid, and in some cases even compounds of arsenic and antimony, would seriously endanger the health of the operator. The *bude light*, obtained by employing an ordinary argand gas-burner with oxygen, instead of air, was experimented with, and found not to yield sufficient actinic light.

By far the most promising line of research was that upon the light evolved when some of the earths, lime, magnesia, or zirconia were rendered intensely incandescent by heat. The ordinary lime light, in which a cylinder of lime is heated by means of the oxyhydrogen blowpipe, is an example. The ordinary apparatus was found to be quite insufficient for the purpose besides being attended with considerable danger. Mr. Crookes, however, succeeded after some time in forming an arrangement for the evolution of light from an earthy compound (differing from, and far superior to lime), which, whilst more intense than the lime light, was entirely unattended with danger. This was the line of research which was ultimately decided upon, and which Mr. Crookes strongly urged should be followed up, as being likely to prove successful in its application to photographic purposes. The spectrum obtained from an incandescent earth was found not to contain such high rays as those from electric sources, not being more extended than that from sunlight, but they were seen to be tolerably intense, and had the advantage over the mercury spark, in that they were continuous throughout the whole length of the spectrum.

By taking photographs in the ordinary way, illuminating the object by means of the incandescent earth light, one difficulty was met with of the shadows being very hard and sharp: this was got rid of by increasing the diameter of the incandescent earth by interposing ground *quartz* (not ground *glass*, as that intercepts many of the valuable rays) between the light and the object, close to the former, or by employing reflectors. Ultimately, however, this difficulty was easily and simply overcome by moving the source of light in different directions during the time that the picture was being taken; by that means a roundness and transparency was obtained in the shadows, similar to that produced by diffused daylight. It was also shown that it was possible to entirely get rid of all the shadows in this manner by so arranging the successive foci of light, and the time during which each acted, that every side of the prominent parts of the object would be equally illuminated. It was proved in this manner that a hard sharp outline was by no means necessary to an object illuminated by light issuing from a point. We do not know the details of the light-producing machinery contemplated by the Lime Light or the Fitzmaurice Light Company, but we should imagine that a careful study of some of the points experimented upon by Mr. Crookes would prove of considerable advantage, as we are assured by competent authorities that the light produced by that gentleman has never been surpassed.

A curious chemical fact has just been ascertained by means of the spectrum. MM. Bunsen and Kirchhoff have been investigating the action which a prism exercises upon the coloured flames visible when some salts are introduced into a colourless flame. They have found that these flames are by that means split up into different coloured rays which are always identical for the same salt; they have thus described the spectrum produced by the rare elements lithium and strontium, and and have stated that this test for their presence was so delicate that they have succeeded in this manner in ascertaining the presence of these elements in waters which were hitherto considered to be free from them. Acting on this discovery MM. A. and F. Dupré have submitted to spectrum analysis the residues obtained upon the evaporation of several specimens of London waters. They have tried Thames water both taken directly from the river, and after passing through the purifying works of the Chelsea and Lambeth Water Companies, and also water from several wells of different depths, representing the products of the three principal water-bearing strata of London, and in every instance they have discovered both lithium and strontium.

These hitherto-considered rare elements must now be classed amongst the multifarious ingredients which we drink when imbibing a glass of so-called pure water.

PRINTING AND TONING OF ALBUMENIZED PRINTS.*

BY J. STUART.

There is some attention required to see that all the parts are printing equally. You will find in some negatives parts which come out too rapidly: others—as in the case of groups, some being in the foreground—get overdone, so as to make the impression on the paper destitute of light or shade. There should always exist a certain amount of difference between those in the foreground and those in the back, but not to the extent that at times is produced in the negative; of course, without that the picture will be flat and worthless. There is, as the Yankee would say, who has been writing to one of the journals lately, a "little dodge which you may here practise." Take a large magnifying glass and hold it up to the sun, letting the focus (not the burning point) fall on the face or faces as the case may be. You can make the light large or small as you find it answer your purpose. The lens I use is about ten inches diameter; and I have found it of great service to me when there was anything white in the picture—such as a white dress, book, or letter—the details being visible when looking through the negative, but which would not print till all the rest of the picture was overdone. I don't lay down the use of the lens in this way as anything new: one cannot mention a thing which some one has not known before. I fear some of you may think I speak long about trifles. Your print is now ready for taking out of the printing frame. In appearance it should be what you would say "just too dark." Some paper gives way much in the after toning and fixing: others little or nothing: practice can be your only guide. If you can be ready for toning in an hour or two, lay the print down on water (face downwards) for about five minutes. This water should be kept till you have floated a number of prints on it; then throw it into a large jar kept for waste silver solutions, in the jar you may have some pieces of copper, which will reduce the nitrate to the metallic state. When you have a stock of it you may wash it and dissolve it in nitric acid; it will be quite good for the paper silver bath. Upon no account should the prints be *immersed* in the first washing water, as it would cause liability to stains, there being so much difficulty in removing the free nitrate out of the paper, and it throws down a quantity of the gold in the toning solution. After floating the proof on the first water, lift it up, and plunge it into water kept constantly changing: a self-acting tray you will find a great advantage. Having turned them about three or four times in the hour or two they lie in the water, they are ready for toning.

Arrange now all your trays, side by side:—first your toning tray set inside another, so that you may pour warm water about the toning tray at pleasure; secondly a tray with clean water; thirdly, the tray with the fixing solution. Toning solution:—chloride of gold in solution (one grain to the drachm of water) one drachm; water about two ounces; then drop in a piece of litmus paper, which at first will be reddened; then take a saturated solution of carbonate of soda, and add till the litmus is brought back to its blue colour—any more has a tendency to soften the prints. Throw it then into your toning tray. This is by far the best toning bath, as it combines simplicity with certainty. The fixing bath is as follows:—hypo of soda 6 oz.; water 20 oz. Pour in as much as will cover the prints you have to tone—more is not required. Do not use the fixing bath twice, as there is no certainty of getting well-fixed prints after it has been once used. I have often found them turn yellow; if not at the time after a day or two. It is so pleasant to see pure whites, one should not grumble to spend a few pence in securing them.

In toning the print lift it out of the water and pop it into the toning-tray: keep it in constant motion with your left hand. When it is rather darker than you would like it to remain, lift it out with the left hand, give it a rinse through the water with the right hand; then through the fixing bath, letting it lie for fifteen minutes with occasional turning so as to insure its being well fixed. If air bubbles get between the print and soda, they will cause spots from imperfect fixing. Some may wonder how I say, take the left hand for toning and the right for fixing. Were you to knock the hand into the gold solution that had been in the hyposulphite of soda it would deposit all your gold. I believe that through this very small matter the manufacturer is blamed when the bath will not tone more than two or three prints when it should have toned six at least.

I now go on with the toning of the other prints, working with the solution first made, till it becomes rather slow; when by pouring hot water about it, it starts off again; and so on till the last of the gold is wrought up. The prints having been left in the hyposulphite of soda for fifteen minutes, put them into water kept constantly changed (as before stated in a self-acting tray). Having allowed them to have two or three changes of cold water, then turn on the hot—say about blood heat: keep them constantly moving about for twenty minutes or so. You may now turn off the hot and let in the cold water for an hour or two; then allow them to soak all night, when you may turn on the water for an hour or two again. Some recommend that the prints should be dried off between folds of blotting-paper: that I think unnecessary. Hang them then over a line to dry; when dry they are ready for mounting.

Though the mounting of the prints does not exactly come under this head, yet I may be allowed to say a few words on so important a subject. After the prints are dry the first thing is to cover them over with patent starch paste: they are then dried, trimmed on the edges, and are ready for mounting on cardboard. Having a lithographic press all ready, take a wet sponge and cover all over the cardboard. Lay the print you are to mount on the cardboard in its right place, holding the two together till you lay them face downwards on the stone: now put down the tympan, and one pull through will make them adhere, so that no amount of labour can take them off. In this way I can mount and press about 100 (8½ by 6½) prints in one hour. There is another advantage in this mode—the boards do not turn up so much.

RECENT PHOTOGRAPHIC PUBLICATIONS.

Of all the uses to which photography can be applied, first in importance after the representation of architectural details stands the reproduction of drawings and pictures. This, we believe, may be maintained in spite of those operations of chymical and photological laws which involve inevitable changes of colour in all photographs from tinted surfaces, and which go far to render certain pictures absolutely untranslateable into photography—the language of the sun.

The great advantage which photographic reproductions of drawings have over every other kind of fac-simile is, to our mind, incontestable. We have only to look at any of the many series that have been published from the collections of drawings in the Louvre, the British Museum, the Uffizii, and the galleries of Vienna, Munich, and Berlin, or at the great photographs of the Cartoons, to feel that the photograph of a drawing in black and white, sepia or gray, is hardly distinguishable from the original, and that even when the original is in red chalk the photographic reproduction—darkened as it is—has a precision and spirit that give it a value beyond the most careful copy that can be made by hand.

How much may be done in the way of photographic reproduction of pictures, the publishers of the works which head this notice have proved on a large scale first by the publication of their *Gems of the Manchester Art Treasures Exhibition*—a work of great magnitude, vast outlay, and, we believe we may add, corresponding success—and subsequently by their large photographs from the Cartoons of Raffaelle both complete and in detail. But what Colnaghi and Co., with the aid of their photographic associates—Caldesi and Blandford—do for the public on a large scale, many of our artists are now in the habit of having done for their own satisfaction in little. The practice of having their pictures photographed is largely spreading among our painters, and the fact shows, what no man who has the painter's feeling needs proof of, that photographs of pictures have qualities that more than make up for their inevitable untruthfulness in rendering certain colours. They render the spirit and expression of their originals with an effect that may well drive the engraver to despair; and, even when they alter the balance of light and shade, they seem to give you a new and hardly inferior version of the original, which has many of the most attractive qualities of a consummate sketch in monochrome with a precision of line and a fulness of detail to which no sketch, of course, can, in the nature of things, pretend.

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* Continued from p. 330.

Another advantage of this application of photography is that undertakings become possible which, without it, would be precluded by the enormous outlay of capital necessary to repay the line engraver for his patient and elaborate toil. Take the works before us. Here is the famous Hertford Gallery, including 30 masterpieces, photographed for £6 6s., at a cost for each plate separately of 6s. Thus, we have two Vandycks, two Rembrandts, two works of Velasquez, four of Murillo, seven of Reynolds, besides other pictures of less mark. On what a sale must the publisher have relied, and at what a price, before such a work as this could have been undertaken in the days before photography? Then take the individual photographs on their merits. Without going so far as Mr. Ruskin goes in disparagement of the line engraver's processes and equivalents, let us ask what line engraving can stand beside even the least satisfactory of these photographs as a representative of the original, for those who love, above all, the essence and spirit of a picture? It is curious with what effect even the golden-toned Murillo and mellow Velasquez are copied by that sun to whom these great masters did such liege suit and service in their native Spain. The key of colour may be lowered, but what perfectly satisfactory renderings are these of the "Enfant Duc Balthazar" and the "Lady with a Fan," by Velasquez, or these of "The Annunciation" and the sweet "Virgin and Child," by the great painter of Seville. And what *burin*, of the many admirable ones that have attempted to translate into black and white the easy grace and harmonious colour of Vandyck, ever did as complete justice to the great *cavaliero* master as Phœbus Apollo has done to him in these photographs of Philip Le Roy and his stately lady?

Then take the Sir Joshuas. It is the greatest compliment to the Mac Ardells, the Watsons, and the Samuel Reynoldses, to whose skill and spirit we owe the admirable mezzotints from Sir Joshua's finest pictures, to say that we are irresistably reminded of them by these photographic versions of the same originals. But in the latter we have the pleasure of tracing every sweep of the painter's brush; we mark his handling, and seem to see into the very texture and touch of his work, as if we had the canvas itself under our eye. The small scale on which the Royal Gallery at Buckingham Palace has been photographed reduces the importance of the second on our list below that of the Hertford Gallery. But these little gem-like reproductions of the Flemish cabinet pictures, by which—thanks to the taste of George IV.—the Buckingham Gallery is almost exclusively occupied, will bear the closest, even microscopic, examination, and give us more than the pleasure that the finest sepia drawings from the pictures on the same scale could confer. The work comprises 40 pictures from the best-known Flemish masters, including an inimitable De Hooghe, besides two Greuzes, of which the photographs have reproduced the somewhat affected grace with a peculiar success, which may be accounted for by the gray tone of the French painter's colouring.

But a much more important undertaking than either of these—as involving great judgment in selection from a singularly rich mine of materials—is the *Photographic Historical Portrait Gallery* now in progress, of which the first two numbers are before us. For this work Messrs. Colnaghi and Scott have had placed at their command the enormous treasures of historical portraiture which exist in the many historical houses of England, including such collections of miniatures as the Duke of Buccleuch's, and others scarcely inferior. Only those who have made a special study of the history of art in England are aware how curiously rich England has been from the period of Henry VIII. in admirable miniature painters. Hilliers, Olivers, and Coopers are but leading names in a long list of men who wrought with singular skill and fidelity to nature on a far minuter scale than our own Rosses and Thorburns, and with a patience of imitative elaboration which would put to shame even the most determined efforts of our most microscopic Pre-Raphaelites.

This *Portrait Gallery* promises to be a work of real historical value. It begins with a sheet of Tudor miniatures, admirably rendered by the photograph, representing at the top Henry VII. and Elizabeth of York, and below Henry VIII., flanked by Catherine of Arragon and Anna Boleyn, and supported by Bloody Mary and Queen Elizabeth. Many of the portraits thus reproduced are historical in themselves as well as in their subjects. They have figured among the ornaments of royal closets. They have been worn round royal necks, or rested on queenly hearts; have been presents to court favourites, or have served monarchs and heirs apparent to choose wives by. The photographs in many cases give the curious original settings of miniatures which have been worn in the pendant "jewels," so common under the Tudors and Stuarts. Here is that hoary old sinner Dudley, doing his best to look venerable by aid of his white beard: the three graceful young Montacutes who rode at their proud father's back, heading 200 horsemen of their house to their liege queen at Tilbury; Catherine Carey, the Countess of Nottingham, who kept back the ring with which Elizabeth's lingering love would have rescued Essex from the scaffold; Anne Clifford, Countess of Dorset, Pembroke, and Montgomery, that strongest minded of historical women, the pupil of Daniel, twice wedded—first to a Sackville, then to a Herbert; the rebuilder—almost refounder—of her six great Westmoreland castles—Pendragon, Skipton, Appleby, Brougham, Brugh, and Braden; the founder or adorner of parish churches, almshouses, and monuments past counting; and the writer of that memorable epistle to Lord Treasurer Danby, when he wished to impose on her a member for Westmoreland,—"I have been neglected by a king, bullied by a usurper, but I will not be dictated to by a subject; your man shan't stand;" and the fair Persian, Lady Teresa Shirley, wife to the youngest of those wonderful brothers, "the three Shirleys," whose lives were a succession of romances. Here, besides, are miniatures of James I. and his daughter, the hapless Queen of Bohemia, with her husband, when still Elector Palatine; Prince Henry, the hope of the nation, prematurely cut off in the very flush of his noble promise, and Charles, both as Prince and King, with his lovely French Queen, and "La Belle Henriette," their fair daughter, and their graceless heir apparent, afterwards the Merry Monarch, with his black-browed, but kindly favoured, Catherine of Braganza. After these, far surpassing in power all the finest and faithfullest work of all our Hilliers and Olivers, here are the celebrated Cromwell miniatures by Cooper, including that unfinished one of the Great Protector himself, which Cromwell is said to have caught the painter in the act of copying surreptitiously, and to have given him a "wigging" that must, one may well fancy, have taken away all disposition in the painter ever to complete his work. Cromwell's grand grim face, with its warts honestly pourtrayed as he could have them, may be studied here, between the wife he addressed so lovingly from the field of Dunbar, as "dearer to him than any creature," and the daughter, Elizabeth Claypole, the most fondly loved of all his children.

It will be difficult to excel in future numbers the interest of the two published parts of this collection, and we may safely promise for the complete work a place with, but infinitely above *Lodge's Portraits* in the library of every student of history. The photographs are accompanied by well-written and well-studied letter-press, contributed by Amelia H. Edwards.

The last work on our list is a series of photographs reproducing examples from that curious diversity of portraits, all bearing the name of Mary Queen of Scots, exhibited at the Archæological Institute in 1857, and which, if they did not solve the problem what Mary was like, at least left us astonished either at the malignity of her portrait painters, or at the reputation of her loveliness, according as we preferred to believe in the lady or her limners.—*The Times.*

Photographic Tourist.*

A FEW DAYS ON DARTMOOR.

Some pretty pictures could be got of the houses in Widdecombe "town," but as I have before stated, my object was to obtain photographs of the Druidical and aboriginal antiquities of the moor, and only to take note of picturesque subjects for a future day. So, leaving this lovely valley, I took my way for Rippon Tor, some two or three miles distant. Looking back, I could not help noticing the great height of the church tower, as being so contrary to the general custom in this exposed region.

A famous logan stone, locally named "the nutcrackers," was the more immediate object of my search at Rippon Tor. By keeping the road as far as "New House"—a farm-building which has, apparently, been in ruins for the last fifty years—I had no difficulty in finding it, as from the road, it can plainly be seen standing in the middle of a group of rocks some distance from the summit of the tor.

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* Continued from p. 308.

This logan stone is a far more interesting specimen than its larger and more noted contemporary on the Teign river, of which I shall have to speak hereafter. The superincumbent mass of granite, measuring from fifteen to twenty feet in length, five in breadth, and about the same in depth, scarcely seems to touch the pedestal on which it rests. Its rocking power is now gone, but with very little trouble it could be made to "log" as in days long gone by, when it formed an important item in the mystic apparatus of Druidism.

Although here on the exposed side of the hill the wind was very high, and the misty rain was being blown by in massive clouds, I determined to take home some memento of this interesting rock; so choosing a position a few yards on the higher side, I had no difficulty in getting an artistic composition. Tonhill Tor in the distance, the ruins of the little farm-house by the roadside below, the numerous granite boulders surrounding this singularly-poised rock, would all, under more favourable circumstances, contribute towards the making up of a picture that might be prized both by the artist and the antiquarian. Placing myself so as to shelter the camera from the wind as much as possible, I exposed a plate. On developing it some two or three weeks afterwards I found, as I expected, that the vibration was very considerable. Although this produced a blurred appearance, yet I secured a faithful representation of this Druidical curiosity, and I treasure the plate among my negatives until opportunity enables me to replace it by a better. Somewhat to my surprise I got no trace of either Tonhill Tor or the farm-house—so dense were the intervening clouds of misty rain.

From this I bent my steps towards the summit of Rippon Tor. By the time I got there it began to clear, so that I could obtain glimpses of the surrounding country. The prospect from here is so similar to that from Heytor, situated about a mile to the north, that one description will serve; and as Heytor is more generally visited than any other of the Dartmoor eminences, I will, if you please, make for it at once.

Heytor rocks—two tors about half a mile apart—from their prominent position and outline, are familiar to every inhabitant of the western part of Devonshire. Being easy of access, it is a favourite resort for excursionists and pic-nic parties; and tourists, who chance to come anywhere near, consider themselves bound to "do" Heytor rocks. The northern tor is of much greater importance than the other. The bold, massive rocks rising from the plain do not present a very picturesque appearance as a whole; but some interesting "bits" can easily be got. For me to attempt to expose a plate was, however, entirely out of the question, for although rain and mist had entirely disappeared, yet the wind in this high unprotected spot, was blowing "half a gale." So fiercely did it rage, that on the windward side of the rocks I could with difficulty stand.

I was aware that on the summit of this tor I should find a good specimen of the rock basin. So taking advantage of the rude steps and iron railings placed there for the convenience of excursionists, I cautiously crept to the top. Directly I reached the uppermost portion of the rock I threw myself flat on my face, as otherwise I should have been blown off bodily. In this way, offering as little surface as possible to the wind, I crawled along some ten or twelve feet until I reached the basin. I found it about two feet in diameter, and five or six inches in depth, with the lip as usual towards the east. I will not here venture to give an opinion as to whether these basins are natural or artificial; certain it is, that those hollows in the rocks which are termed rock basins, and supposed by many to be artificial, differ very materially from others which are stated by the same authorities to have a natural origin. The so-called artificial specimens are far more symmetrical, and show the effects of weathering in a much less degree than those which evidently got their origin from natural causes. The winds which on Dartmoor are most prevalent, and have the greatest "weathering" power, are from the west and south-west. Thus it is that the tors are more precipitous towards those points, and the sides of the hills facing in those directions have their rocks laid bare. From this same cause the rock hollows designated "natural," are oblong and not circular as are the "basins." A great deal has been said on both sides of the question, each argument satisfying the writer, and probably no one else.

The view from Heytor is very extensive—more so perhaps than from any other point in this quarter of the moor. So much, however, is included of what I have before described, that I need say but little here. The course of the Teign can be traced for a long distance, and its estuary appears like a large inland lake. The Dart also has its track distinctly marked out from Dartmeet till it reaches the sea at Dartmouth. One well acquainted with the country could gaze on this natural map of the county from Bolt Head to the Exe, and note with pleasure the position of many a known spot.

The pedestrian has one great advantage over the tourist who rides or drives a "trap;" he can make for any given point regardless of roads or tracks. So leaving Heytor, I took as straight a line as I could for Hounditor, passing the granite quarries from which so much of the "Dartmoor granite" used to be procured; the stone being conveyed for miles by tramways to the Teign. Crossing the intervening valley and ascending the opposite slope, I reached some fine bold rocks, very near the summit of Hounditor, and being somewhat under the hill and sheltered from the wind, I got a very good artistic study. Here I spent about half an hour in gleaning bilberries, or whortle-berries—locally called "hurts"—which were remarkably fine just at this spot. This was my lunch, and was all that I had from the time I left Widdecombe until, in the evening, I reached Moreton Hampstead. M. H.

(*To be continued.*)

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 14*th November*, 1860.

Photography is assuming colossal proportions. Portraits as large as life, and as much larger as your vanity may demand, can be had for the asking. The Emperor has allowed himself to be taken "full height," and the sight-seeing public is flocking in crowds to pay its tribute of curiosity and admiration. One artist, who considers magnitude a supreme quality in art, is preparing his canvas, or paper rather, ten feet square, within which unwonted photographic space he proposes to put men, horses, carriages, or anything else his patrons may command. He has already bespoke the Emperor on horseback with his staff, also on horseback. As my facetious friend Bric remarks, "that at the rate the photographer is going on, he will soon be able to take Paris entire, full size; but then the question arises, what will he do with it when taken?" It would answer admirably as a panoramic exhibition, and if transported to London, might raise the fortunes even of your Surrey Gardens.

But, jesting apart, there is something very wonderful, and I may say beautiful, in the life size portraits, which in conjunction with the visiting card portraits, would keep photographers very busy, if weather permitted.

Honour to whom honour is due. The merit of the discovery of malleable platinum has been generally attributed to Prout, Wollaston, and Fourcroy, and also to Bréant and Janetty, who first established a factory for its production in France. In the eighteenth century South America sent not only gold and silver to Spain, but also a mineral in small grains, white, hard, brittle and infusible, which was called *platina*, that is, silver, from the word *plata*, silver. In 1780, a French chemist, Pierre François Chabaneau, endeavoured to obtain platina in ingots, and his researches were crowned with success. The king, Charles III., proud of the discovery being made in his capital, had a medal struck in platina in honour of the success, and granted Chabaneau a pension. The patents are dated 1785, and therefore fully established the right to priority in Chabaneau.

Herr Magnus, of Berlin, has made some very interesting researches on "*the conductibility of gases.*" His apparatus consists of a glass tube within which a thermometer is fixed, which can be observed from without. The tube is filled with gas, more or less condensed, and the upper portion of the glass tube is maintained at the temperature of boiling water, while the ambient air is constantly 60° F. Only the upper part of the tube is heated, in order to avoid as much as possible ascending currents. The state of the thermometer in the different gases is compared with that at which it stands in a vacuum. The following are the results obtained:—

1st. The temperature of a thermometer placed in a space heated above, varies with the different gases contained in the space.

2nd. It rises higher in hydrogen than in any other gas.

3rd. It is much higher in hydrogen than in the vacuum, and much more so if the gas be condensed.

4th. Hydrogen therefore conducts caloric like the metals.

5th. In the other gases, the temperature rises less than in the vacuum, and it rises much less when the gases are denser.

6th. It does not follow that these gases have no conducting power, but only that it is so feeble that the diathermancy of the gas disguises and annuls it.

7th. The extraordinary conductibility of hydrogen is evident not only when this gas is freely mobile, but also when it is enclosed in the eider-down, or in any other sufficiently porous substance.

8th. This property of hydrogen is a fresh proof of its analogy with the metals.

9th. Hydrogen conducts not only caloric but also electricity, better than all other gaseous substances.

Some experiments made by Gustavus Rose of Berlin have led that eminent chemist to the following conclusions:—

1st. Calcareous stones and chalk do not appear susceptible of becoming transformed into well crystallized Iceland spar by the action of a very high temperature in close vessels, and in general rhomboidal carbonate of lime is not formed by the dry way.

2nd. In evaporating a solution of carbonate of lime in water charged with carbonic acid, at ordinary or elevated temperatures, we can obtain the three heteromorphous states of this substance, that is to say, Iceland spar arragonite, and chalk.

3rd. By the moist way it appears that we can only transform it into Iceland spar, on condition of operating in a medium of carbonic gas, or when the crystallization is made with the disengagement of that gas. Arragonite is obtained even with difficulty, only at a temperature below 120° F., and not at all at 86°.

The eminent chemist Stas, of Brussels, has published a very important and remarkable essay on the much mooted question of the relations between the atomic or molecular weights of simple substances. He is quite convinced that the law of Prout, with all the modifications of Dumas, is only an illusion—a pure hypothesis, formally contradicted by experiment . . . that there exists no common divisor between the weights of the simple bodies which unite to form all definite combinations.

His researches have been made on well-known bodies—nitrogen, chlorine, sulphur, potassium, lead and silver—which were selected because they form the most stable compounds, and generally obey the law of Prout. The determination of the relations was made either by synthesis or by double decomposition. Analysis was only had recourse to for procuring the elements necessary to the calculation of the atomic weights in acting with oxygen. He made the *synthesis* of chloride of silver, sulphide of silver, nitrate of silver, nitrate of lead, and sulphate of lead; the analysis of chlorate of potassa, and sulphate of silver. He sought the proportional numbers between silver and chloride of potassium, silver and chloride of sodium, silver and chloride of ammonium, nitrate of silver amd chloride of potassium, nitrate of silver and chloride of ammonium. By thus opposing simple bodies to simple bodies, a simple body to compound bodies, and compound bodies to compound bodies, he sought to obtain results naturally susceptible of being controlled by each other.

Chemists will doubtless hesitate before they accept these conclusions as the necessary consequences of his experiments, or that his experiments will not admit of a different interpretation to what he has put upon them. But, as he says, "the illustrious Berzelius devoted a great part of his life to fixing proportions or chemical equivalents: his labours on this subject remain as imperishable monuments of his sagacity and genius; he concluded from his researches that there exists no simple relation between the weights of the atoms of bodies, and remained convinced of this truth all his life."

Dumas, in 1857, published a "Memoir on the Equivalents of Simple Bodies." He proved that all well-known bodies perfectly conform to the principle of Prout, but only in the sense that the atomic weights of simple bodies are multiples of the atomic weight of hydrogen, or of its half, or of its fourth.

The stalks of the Chinese *sorgho* contain a colouring matter possessing great tinctorial power. It is prepared by fermenting the stalks of the plant from which the juice has been expressed. At the expiration of fifteen days the colouring matter is developed, and it gives a beautiful brown or red colour to the stalks. They are dried to stop the fermentation, and then ground to a fine powder, which is treated with water; this removes a small portion of the colour; it is then treated with a weak solution of caustic soda or potassa. The base is neutralized by sulphuric acid, and the carmine is soon deposited under the form of light flakes. The red of the sorgho is soluble in alcohol, the alkalies, and feeble acids. It answers very well for dyeing silk and wool, and it appears to resist the action of light.

Hydrogen, under ordinary circumstances, does not reduce metallic solutions; but, according to Mr. Beketoff, it does, under pressure. In that case the compressed hydrogen, in the course of a few days, reduces to the metallic state solutions of nitrate and sulphate of silver, and nitrate of mercury: it appears to act especially when the solutions are diluted.

Iron and steel may be coloured, ornamented, and preserved by a process discovered by M. Thirault. Four liquids are necessary:—

No. 1. A mixture of bichloride of mercury and sal ammoniac in water.

No. 2. Perchloride of iron, sulphate of copper, nitric acid, alcohol and water.

No. 3. Perchloride and protochloride of mercury, with the addition of nitric acid, alcohol, and water.

No. 4. A weak solution of sulphide of potassium.

By means of a sponge slightly moistened we apply to a piece of the metal, well cleansed, two coatings of the preparation No. 1, taking care to apply the second only when the crust of oxide formed on the metal is quite dry, rubbed with iron filings, and wiped with a cloth, as in the other stages of the operation.

Several coats of No. 2 are next applied, and some of No. 3, with a full sponge, and after drying ten minutes the metal is put into a water bath at a temperature of 200° to 212° F., where they remain from five to ten minutes according to their size; after being wiped they again receive some coatings of No. 3, then a thick coating of No. 4, whereupon they are again immersed in the warm-water bath.

When the metal is removed from the bath, it is wiped, and with a piece of carded cotton several coatings of No. 3, each successively diluted with a large quantity of water, then a little olive oil is passed over it and wiped; it is then again placed in the bath at a temperature of 140° F., and when removed it is rubbed quickly with a piece of woollen rag, and lastly with a little oil.

The pieces of metal treated in this manner have a fine bright black, especially if they be suitably polished.

Iron and cemented steel assume a uniform splendour and colour by this process. Cast iron is more difficult to treat, but it does not assume a uniform tint.

When a platinum wire is introduced into the flame of a spirit-lamp, or a jet of hydrogen gas, the intensity of the flame is considerably increased. This effect is most evident when the platinum wire is placed at the top of the flame, or rather in the incandescent but scarcely luminous air, situated immediately above the point of the incandescent cone. Glass, refractory clay, sulphate, or carbonate of lime especially, may be substituted for the platinum wire.

Proceedings of Societies.

Manchester Photogrpahic Society.

The monthly meeting was held on the evening of the 7th inst., in the rooms of the Literary and Philosophical Society, George-street, Professor **Williamson**, presiding.

After the election of some new members, specimens were presented to the society by Mr. Sidebotham, Mr. Wardley, and Mr. Dallmeyer. In reference to the latter, a letter was read by Mr. Nevill, from Mr. Dallmeyer, describing the particulars of his triple combination lens with which the pictures were produced.

Mr. **Wardley** remarked that he had been for some time looking for such improvements as Mr. Dallmeyer's lens seemed to effect. The picture of the Interior of Winchester Cathedral was a severe test, and the lines of the columns were absolutely straight; the slight convergence being manifestly due to the tilting of the camera. The lines in the map were absolutely square and straight.

Some further conversation on the subject ensued, and a vote of thanks to Mr. Dallmeyer was then passed.

Mr. **Mabley** then laid before the society the results of some interesting experiments recently undertaken by Mr. Petschler, in reference to the use of chloride of gold in producing negatives. The plates were prepared as for collodio-albumen, the whole of the free nitrate of silver from the last silver bath having been decomposed by a chloride. Upon one-half of the plate was poured a weak solution of chloride of gold, and the exposure in the camera for twenty seconds took place about three hours afterwards, with a stereo lens one quarter inch aperture. On the half treated with gold there was a picture of full exposure; on the other half not a trace of development. The picture was certainly very foggy, but if some means could be found of preventing the fog, it might be perhaps the key to a quick dry process.

After some further conversation a question was asked as to what led Mr. Petschler to make the experiment.

Mr. **Petschler** said he was printing on a dull day, and tried to finish the printing by development. Upon one of the pieces of paper some solution of gold had been splashed, and on those parts the picture started out with great rapidity when treated with gallic acid, while the lights remained pure.

Some contrivances for the rapid and effectual beating up of albumen were then shown, one by Mr. Nolan and another by Mr. Heywood; and six negatives by Mr. Parry's process for coagulating the albumen with the hot water, were shown by Mr. Pegg, and pronounced successful. Some further conversation as to the Exchange Club in connection with the society terminated the proceedings.

Birmingham Photographic Society.

The annual meeting of this society, which has now been four years in existence, was held on the evening of the 30th ult. Mr. W. B. **Osborn**, one of the vice-presidents, in the chair. The report, which was read by the treasurer, stated that the general position of the society was properous and satisfactory. The number of members at present on the books of the society was thirty; and that a balance of £14. 14s. 11d. was in the hand of the treasurer.

The officers elected for the year were as follows:—

President—The Right Hon. Lord Calthorpe.

Vice-Presidents—Mr. W. B. Osborn, and Mr. C. L. Haines.

Treasurer—Mr. John Thomas Brown, jun.

Secretary—Mr. John Thomas Brown, jun. *pro. tem.*

Council—Dr. Hill Norris, Mr. Rejlander (Wolverhampton), Mr. Hart, Mr. Morris, Mr. Robinson (Leamington), Mr. J. Turner, Mr. Hunt, Mr. H. H. Plante.

It will be seen that the Council of this society includes the names of the two gentlemen who have especially distinguished themselves by the production of successful composition photographs—Mr. Rejlander and Mr. Robinson. A portfolio of studies from life by the former gentleman, and some prints and negatives by Dr. Hill Norris from his sensitive dry plates, were exhibited, and excited much admiration.

The usual vote of thanks terminated the proceedings.

PHOTOGRAPHY AT SOUTH KENSINGTON MUSEUM.*

John Scott, Esq.; examination continued.

"917. You say that you could not photograph them without the permission of Government: do you complain that the Government should photograph things which nobody could photograph without their permission?—Most certainly, if they produce them at a price that defies all competition, using the public money to crush private enterprise.

"918. When you talk of the Government competing with private individuals, you mean the Government competing with those to whom it gives the means of competing with it?—Yes.

"919. When the Government had given you that privilege of photographing the cartoons at Hampton Court, which you could not have photographed without permission, did it recede from the offer it had made?—The Government never receded, because when the matter was properly brought forward, they thought they were bound to carry out their promise.

"920. Was there any offer or terms made with you as to your rent, or as to the scaffolding, or as to the expenses you were to be put to, in taking the photographs?—To the best of my belief, we considered that we were there without any help from the Department of Science and Art, except the use of the scaffolding. Mr. Thurston Thompson was there with a very large body of sappers and miners, and we were there with our three people. Except in one or two cases, Signor Caldesi never had any assistance from the officials connected with the Department of Science and Art who were there. We did not know that they were authorised to help us, and on one or two occasions, when they did trifling things for us, the corporal, or whoever he was, was given half-a-crown or 5*s.*; and it was only when the whole thing was over that we received a bill, stating that we were liable for 30*l.* to Mr. Somebody for the scaffolding erected for us to do those cartoons.

"921. Sir *John Shelley.*] Did you pay that?—That account we thought monstrous, because there were charges in it for time, which loss of time had been entirely caused by the delays of the Government photographer. We had gained our object, and we sent the Department a cheque for 30*l.*

"922. Mr. *Adderley.*] Did they in any respect give you less aid than they led you to expect you should receive?—They never led us to expect that we should receive any aid; but they led us to believe, from the first, that they would carry out a system of hostility against us.

"923. Therefore, when you accepted from the Board of Works the permission to photograph the cartoons, you expected to have all the expenses which afterwards you incurred?—I expected nothing at all. All I judged by was this letter: 'These arrangements have been made by the Department of Science and Art, and approved by the Board, and permission has been given to the officers of that Department to take photographs of the cartoons for the use of the Schools of Art.' The permission was given entirely for the use of the Schools of Art, and that is a strong point; it was not given for the purpose of photographing works of art for sale.

"924. What facilities were you led to expect when you first got the permission, which you afterwards failed to receive?—The necessary facilities which Mr. Willshire had been directed to give us.

"925. What were they?—I do not know.

"926. You had all the facilities which at the time you accepted the offer you expected to receive?—We had the facilities consequent upon the permission to do the cartoons, and afterwards we had to pay 30*l.* for them.

"927. Had you any promise when you accepted this permission to photograph the cartoons that the Government should not sell their photographs at a less price than yours?—I cannot say that I had reasoned the whole thing out in my own mind, but the proposition that the cartoons should ever be sold at their present price was so monstrous an idea that it never crossed my mind, and judging from the letter from the Board of Works by which I saw that those things were to be produced for the use of the schools, I of course, never supposed that they were to be dealt with in the way they have been.

"928. Who first got the photographs of the cartoons of Raffaelle into sale; Signor Caldesi or the Department?—Signor Caldesi decidedly; my impression is that we began to take orders on a specimen in August. It was impossible to print them in bad weather, but a fair subscription was made by showing them, in the same way as the Department of Science and Art and Mr. Thurston Thompson showed theirs at the Exhibition in the beginning of January 1859, so we showed ours; they were made known, and orders were taken upon them.

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* Continued from p. 323.

"929. How was it that Caldesi got his photographs into the market so much earlier than the Department of Science and Art?—I do not know what their mode of working would be.

"930. *Chairman.*] You do not know that they purposely delayed their production for sale, in order not to interfere with you?—No.

"931. Mr. *Adderley.*] At all events the delay was a great advantage to you?—Yes, because otherwise we should have had our throats cut six months sooner.

"932. As far as that advantage was obtained it was a greater advantage than you could have expected at first, was not it?—I expected no advantage nor favour from the Department.

"933. You had no promise from the Department at first, that your works should first get into the market?—I could not suppose that they were going into trade against us.

"934. Did you suppose that they were not going to sell the photographs?—I certainly did not suppose that they were going to open a national shop to sell things at nominal prices.

"935. You were aware that they were things of the same nature?—Yes, I was aware, from Mr. Thompson's expression to me, that he should seek another publisher for his cartoons; that he would publish them against us; but that the Government were going to publish them at a price to drive us out of the market, I never for a moment assumed, because, looking at the course of legislation which has been adopted of late years, I never supposed that the Government intended to establish a monopoly, I having the idea that the South Kensington Museum was intended to foster commerce, and not to prejudice it.

"936. You stated that the Department first gave Caldesi a priority in taking those cartoons?—Yes, the right was established that we had the prior permission; we were the first applicants, which the Department sought to deny.

"937. Did I understand you rightly to state that Caldesi waived that priority in consequence of illness?—No; I stated that Caldesi waived that priority for certain reasons of his own; one was, that it was considered desirable to photograph the cartoons in the shade. The reason Caldesi assigned to Mr. Thurston Thompson for not commencing the photographs on the day the cartoons were at our disposal was, because he was unwilling to run the risk of failure by doing the cartoons in the shade; and as Mr. Thurston Thompson had the confidence of the Department, we thought that anything we said might be opposed; and it was considered to be desirable to let Mr. Thurston Thompson first make the experiment of taking them in the shade.

"938. Will you state the number of unnecessary obstructions and delays that Mr. Thurston Thompson put in your way?—Perhaps I had better read a letter which Caldesi and Co. wrote to Mr. Thurston Thompson, dated 28th August, 1859: 'We regret extremely that we did not see Mr. Redgrave when he called yesterday at Pall Mall East. We learn that Mr. Redgrave is of opinion that the retardation in copying the cartoons has taken place on our part; and, further, that, after September, no more copies will be allowed to be taken, owing to the change in the season; also, that they are to be placed under glass. We think that you will agree that the time occupied by us has been comparatively short. Had we been allowed to have copied the cartoons one after another, we could have completed the whole in one month. We have never occupied more than one day for an experiment to try them in the shade, and only seven days for the completion of the first and second cartoons, whilst you have been two weeks on the first, and three weeks on the second. This, we think, shows that the delay has not resulted on our part; and if every cartoon is to occupy so much time, both of us will lose the opportunity of ever completing these important copies, as we are astonished to learn that in future no one will be allowed to copy them. Our object in writing you at present is to ask you to be good enough to make some new arrangements, whereby we shall be both enabled to complete the set this season. We shall be glad to hear from you at your earliest convenience upon this subject. Should you think it desirable to have an interview, if you will name a day and an hour we shall have great pleasure in waiting upon you.' As Caldesi knew that Mr. Thurston Thompson had stated that I robbed him of his idea, after that which refers to the general business, this paragraph came: 'We understand that you think that the idea of our photographing these cartoons originated in Messrs. Colnaghi's mentioning the subject to us. But this, we beg to assure you, is entirely erroneous; inasmuch as, five years ago, we applied, through Mr. Craufurd, M.P., to obtain permission for copying the cartoons, but the then existing Ministry would not take upon itself the responsibility of allowing the cartoons to be taken down. Some time after this, Sir Benjamin Hall, happening to come to our place, in speaking about the cartoons, promised to give us permission to copy them, and he gave us a non-official permission. This we found insufficient, and we understood that it was necessary that the permission should be official. Sir Benjamin was about to give us it, when the government of Lord Palmerston fell, and it was only in the month of April of the present year that we received from Her Majesty's present advisers the official permission which has already enabled us to take two cartoons. The idea certainly originally emanated from us.' Then we wrote to Mr. Redgrave a letter, of which the substance was to point out to him the delays which had taken place, and to request his interference for the future. Caldesi & Co. then wrote to Mr. Austin, at the Department of Works, on the 6th of October 1859, to this effect:—'Sir,—We are sorry again to have to trouble you in the matter of the Hampton Court photography. We wrote on the 3rd instant regarding the difficulties we have to contend with, but after the despatch of which we received notice from Hampton Court that all difficulties were removed by Mr. Thompson. On the strength of that, we requested you to be good enough to take no notice of our communication. We are now compelled to write again, as Mr. Thompson is now engaged on the seventh cartoon, which, as we showed in our last, was contrary to arrangement, and at the same time he has the sixth cartoon down, which he has finished, and which he will not allow his men to put up again. Thus he has two cartoons at his disposal, and which he makes as an excuse to prevent us having down the 'The Sacrifice,' which, as we stated before, we are desirous of reproducing. We wish you to be good enough to favour us with an order to have the seventh cartoon, and that we shall be allowed to keep it until finished; after which we are anxious to have down 'The Sacrifice,' for which we shall also be glad to receive an order.' The reply to that was, the letter which Mr. Austin wrote to Caldesi & Co., dated the 8th October 1859, ending by saying, 'in consequence of your representation, Mr. Redgrave has already given directions in the matter, and the First Commissioner trusts therefore that no further difficulties will be thrown in your way.' *(To be continued.)*

Photographic Notes and Queries.

INSTANTANEOUS PHOTOGRAPHY.

DEAR SIR,—I have another question to trouble you with, that is respecting instantaneous pictures; I have tried almost everything, both likely and unlikely, to render my preparations sensitive enough. I flatter myself I have some good apparatus, and my attempts at instantaneous photography have all been tried with Ross's quarter-plate lens, using a small Waterhouse diaphragm. I can manage to take a satisfactory negative in two seconds, but I see pictures that must have been taken in less time. I am very fond of taking cattle, and I hope you can assist me. I have contrived all sorts of things for opening and closing the lens, but I am still at a loss to know how they manage to plant the camera, focus, and insert the dark-slide, all in an instant. I have a number of cattle negatives, besides numbers I have sold for as much as 5s. each.

With this I send a proof, not as a specimen to be compared with others far superior, but merely to show you how far I have succeeded.

In some of the windows I see street views, ships on the seas and which must have been focussed and exposed, as quick a, lightning, or at least I fancy so; but how this is done I should like to know.

As far as my own experience is concerned, I know that I have often had my brightest hopes defeated. I prepare my plate, which I place in the dark-slide in my pocket, I then carry camera and cloth into field, where perhaps all is sunshine and quietness. I place my camera at a moderate distance from, perhaps a group of cattle, I then focus as quickly as possible, and yet not hurriedly so as to startle them, I then insert the dark-slide in the camera and pull up the shutter, when this far is done, in nine cases out of ten, off walk the cattle as deliberately as possible, and leave me standing looking like—I need not tell you what.

I think you will say that this is provoking, particularly when you have taken extra care in cleaning and preparing a plate, which I hope will be a sufficient apology for the questions in this letter.—Faithfully yours, S. R. G.

[Some of the difficulties to which our correspondent refers must ever be contingent on the best process of instantaneous photography, as the operations of focussing, withdrawing the screen, and putting in the dark-slide into the camera, must occupy some short space of time, unless the gods invoked by the poet to "annihilate both time and space, and make two lovers happy," could be induced to perform the same kind office for the behoof of the photographer. As regards apparatus, some time may be saved by using the plan in which the focussing glass is not withdrawn, but slipped back, and the dark-slide put in its place. But it will often be advisable after focussing to put the dark-frame in its place, draw up the shutter, and then watch the favourable moment with the finger on the trigger. We make use of the word trigger because we prefer some one of the trigger movements for such purpose. We have seen an excellent plan in which a disc or plate of brass with an aperture, passes rapidly over the front of the lens, the exposure taking place just when the aperture is passing.

As regards the chemical part of the question we believe that in a good light it is not difficult to secure instantaneous effects. A collodion of pure materials containing from half a grain to a grain of bromide to four of iodide; a bath in good condition, without any kind of addition, and iron development will generally give the most rapid results. The negative may easily be intensified, if not sufficiently dense, by the use of iodine and further development with pyrogallic acid. A paper on Instantaneous Photography will be read by Mr. Samuel Fry, whose lunar photographs are well known, at the South London Society on Thursday night. It will appear in our next.

The specimen our correspondent has forwarded consists of horses drinking in a brook, in the midst of which they are standing. With the exception of a slight movement in the head of one of the horses, our correspondent has not much ground for complaining of want of success. The grouping of the horses could not have been better, and is worthy of

Landseer. The water is perfect and the indistictness of the foliage on the distant bank, forming the background is scarcely in our eyes a fault.—Ed.]

Photographic Camera as a Magic Lantern.

Sir,—I have tried, as mentioned in a former number of the Photographic News, a portrait combination consisting of 2 compound achromatic lenses, each 2⅜ in. diameter, 9 in. focus, for a magic lantern. I inserted a large moderator lamp with the globe on, and carefully shut off the light from the room, but by no means could I get any disc, not even a faint one. I also tried a magic lantern glass belonging to a small magic lantern, but there was no trace of the subject or any of the colours on the screen. Can you help me in this dilemma? What sized disc should the lens show, and at what distance? Any information will be received with thanks, or any reference to previous numbers where I could get answers to free me from my difficulty.—Yours truly, A. H. J.

[We presume our correspondent has not placed the light in the right position for the focus of his lens. For successful results in the magic lantern a larger lens of shorter focus is desirable. The size of the disc will be regulated by its distance from the lens and the focal length of the lens. To obtain any proportion of enlargement, multiply the focal length of the lens by the number of times of enlargement desired, and add the focal length of the lens. Then remove the screen that distance from the lens. To obtain an image ten times enlarged with your lens of 9 inches focus, place the screen 99 inches distant. A valuable table for distances, most explicitly stated, calculated for this purpose by Mr. Hannaford, will appear in the forthcoming Photographic News Almanac, which will be ready on the 24th instant. We do not think that good results in the magic lantern will generally be obtained by means of photographic lenses; but perhaps some of our correspondents who have had experience in the matter can give some information.—Ed.]

Visible Image in the Camera.

Sir,—I met with an incident in photography yesterday which to me is quite novel. If you think it worth notice in the Photographic News perhaps some one may be able to account for it. I exposed a glass plate four minutes (wet process) and proceeded to the dark-room, when opening the dark slide I found a complete and perfect outline on the collodion film (of the building I was attempting to photograph) on developing I could not get the picture anything like dense enough for a negative; it looked when finished more like a positive. I afterwards tried several with giving more and less time with no better results. I fancy the developer was in fault for the bath had given good negatives three days before.

Bath, 30 grs. per oz. of water; developer, made a week before, pyrogallic acid 12 grains, water 7 oz.; glacial acetic acid, 1 drachm; alcohol, 2 drachms.

I should have mentioned I used ½-plate lens ¾ in. stop, time 2 o'clock.—Yours respectfully, F. McKenzie.

[We should have judged as you did at first, that the exposure was too long; but you state that you obtained the same results with much shorter exposure. Probably there is some peculiarity in your collodion. We have heard of similar results where a collodion containing iron had been used. Possibly some of our readers may have met with the same phenomenon.—Ed.]

Miscellaneous.

Photograph of Boston from a Balloon.—The idea that it was possible to get photographic pictures of the earth first occurred to Dr. W. H. Helme, of Providence, U.S., who, having interested Mr. Black on the subject, the two made an ascent from Providence a few weeks since, to make a trial in the "high art." Several views were taken at an elevation of 1,200 feet, but these preliminary experiments proved sunlight indispensable to complete success. The last experiment, however, furnishes the most conclusive evidence that photography can be applied, under favourable circumstances, to the production of birds'-eye views of towns and cities, harbours, lakes, and water-courses. Six plates were used, only two of which, however, received satisfactory impressions. The impression which is received in looking at the pictures is similar to that experienced by the aeronauts themselves. The wider streets of the city—in their tortuous windings—seem like mere alleys, dark and narrow, while the alleys themselves are scarcely distinguishable in the midst of the high walls. The public buildings, churches, and long blocks of storehouses look like the toy village of a child, while the shipping at the wharves and sailing craft in the harbour look no bigger than the miniature vessels in the frog pond. And yet the buildings are sharply defined, especially where the sun fell upon them in full force.

Hints to Colorists.

Medium for Oil Colours.—It is frequently wished that mere transparent glazings of oil colours over the photograph, producing as these do so charming an effect with so extremely small an expenditure of time and pains, were permanent enough to be adopted. That such is not the case arises from the fact that the oil coming to the surface very soon becomes a horny yellow coating entirely destructive of beauty and colour. A varnish vehicle would remedy this, but then these are always found to be so unmanageable in any but very skilful and experienced hands that their use is generally at once abandoned. The following medium will however answer the purpose. Take half an ounce of gum animi and one ounce of gum sandarach, and reduce them to a fine powder, put them in a glass vessel containing spirits of wine exposed to the sun until dissolved, and then filter into bottle for use.

Powder Colours.—In applying powder colours to glass pictures, the best effect is obtained by working first on the collodion film, especially with all colours where as much brilliancy as possible is desired. All the flesh tints should be so applied and such portions of the drapery as may require vivid colouring. A thin-bodied varnish should be then applied, and the picture thorougly recoloured throughout. The portions already coloured will now possess a biting surface on which almost any desired depth of tint can be obtained. The class of positive most suitable for colouring is that possessing somewhat chalky lights.

Clausel's Encaustic Paste.—We have received from Mr. Bailey, chemist, of Wolverhampton, a bottle of a preparation with the above name. Its purpose is to preserve, and give brilliancy to paper photographs, either uncoloured or tinted in water colours. It is especially valuable in the case of uncoloured prints on albumenized paper, which have required a little touching at the hand of the artist, either to remedy defects or effect improvements. Every photographer is aware that however accurately the colour with which such touching is effected may harmonise with the tone of the print, yet the difference in texture and surface produced, especially if it strike the eye at an angle, is most offensive. By the use of this encaustic paste, one uniform texture and surface is given to the print after such touching. The detail and general effect of the picture is considerably brought out, moreover, the effect in this respect being similar to a varnish, without, however, the vulgar glazed effect which varnishes &c. give to uncoloured pictures. Mr. Rejlander first called our attention to the advantages of this preparation. His method of using it for tinted pictures is as follows: the albumenized print is first coated with the "Newman's Preparation;" then tinted in water colours, and finally treated with this encaustic paste. The effect, we understand, is very good, and the method of producing it very simple.

Harmonious Colouring.—Our young colourists are so apt to consider certain colours as hot, and certain other colours as cold, without any reference to their action one upon another in contrast, that we venture to call their attention to the following very pithy remarks of Ruskin:—"Every hue throughout your work is so altered by every touch that you add in other places, that what was warm a minute ago becomes cold if you have put a hotter in another place, and what was in harmony when you left it becomes discordant when you set other colours beside it." From not giving proper consideration to the above fact many entirely destroy the harmonies of colour in their productions, and lose that proportion of contrasting colour calculated to give character and force to the predominating mass in their composition.

The Power of Colour.—Opie says much in a very small space in the following quotation:—"Colour must be employed to harmonise, vigorate, soften and aid the chiaroscuro, giving breadth and unity to the masses of brightness or obscurity, and in distinguishing by their depth, strength, or brilliancy, the principal or subordinate figures." Opie here shows us how valuable to the artistic effect the principles of harmonious colouring are, and his last remark should teach the beginner never to use pure colours in his backgrounds or accessories.

Talk in the Studio.

Photographic Papers.—We have received, from Messrs. Hope and Co., of Hammersmith, some specimens of reproductons, printed on different samples of their paper, albumenized and plain salted. The albumenized prints are brilliant, of a rich purple black tone. Those on plain paper are somewhat inferior in brilliancy, but possess great delicacy and a very fine surface, extremely suitable for portraiture. The tones of the specimens before us are all very deep, running on purple browns, purples, and blacks; and any variety of tone, we understand, may be easily secured on the paper. Messrs. Hope adopt the excellent plan of stating the strength of their salting solution, which is twelve grains to the ounce.

The Camera of Horrors.—A paper, with this title, is, we understand, promised by Mr. Rejlander to the next meeting of the Birmingham Photographic Society. We congratulate the society, and photographers at large, on the fact of Mr. Rejlander having been induced to break his long silence. Since his valuable paper, read before the Photographic Society of London a few years ago, describing his mode of operation in producing composition pictures, more especially in reference to the "Two Ways of Life," photographers have not had any paper from his pen.

Photographic Piracy.—A practice largely prevails, we understand, of copying the album portraits of eminent persons. which some enterprising photographer has been at considerable trouble and expense to produce and publish, and from the negative copy so produced to print and issue copies at a lower rate than the original publisher found remunerative. Surely it is high time that an efficient system of photographic copyright were established.

South London Photographic Society.—A report of the proceedings of the meeting of this society, held last night, will appear in our next.

Photographic Society of Scotland.—The Annual Exhibition of this society, usually held at the end of the year, is deferred until February, 1861, and will open on the first Saturday in that month. Two of the society's silver medals will be given as prizes for the two best photographs exhibited. Works intended for exhibition must be delivered, carriage paid, at the rooms, No. 20 George Street, Edinburgh, on the 15th of January, after which none can be received. The society propose to award their bronze medal for papers of merit read at their meetings during the season.

Enlarged Pictures.—A decided rage for enlarged pictures prevails 'in Paris, produced by means of Woodward's and other enlarging cameras. A bust of the Emperor, life-size, by Mayer, excites attention; and a photograph of a pony, life-size, by another artist, is scarce less attractive. The process of Mr. Wothly, referred to by our Paris correspondent a few weeks ago, is stated by M. Lacan, editor of *La Lumiere*, to have been purchased by M. Disderi for 20,000 francs, or nearly £840.

Photographic Illustrations.—An illustrated work, entitled "The Gospel Narrative depicted in Miniature," is announced, to consists of photographs, from drawings by various masters, of the principal scenes in the New Testament. The value of photographic reproductions, as faithful and inexpensive copies of first-class pictures, is becoming daily more recognised, as one of the most important, if not one of the highest, branches of the art.

Instantaneous Photography.—We have recently seen a very fine instantaneous photograph, produced by Mr. Samuel Fry, late of Brighton. It is entitled "The Break in the Clouds." The sun is just peeping through a mass of cumulus clouds, and the rays striking downwards, and diverging as a fan, are beautifully reflected on the dark mass. The foreground, if the term is admissible in such a case, is a very finely depicted sea and boats on the beach.

⁂ Our Correspondents will aid us in our endeavours to solve their difficulties if they will in all cases state details of their operations when failures occur; and when referring to former articles in the News giving the exact reference. Signatures, such as "Positive," "Subscriber," and others of a like nature, should be avoided, as it sometimes occurs that two correspondents make use of the same signature. Initials are generally best. Letters intended for the Editor should be addressed expressly to him.

To Correspondents.

J. W. P.—By the addition of the "burnt bones" you have probably reduced some portion of the silver in your sensitizing bath, and consequently reduced its strength. When your silver bath dissolves the albumen from the paper you may be sure it is too weak. You should use a silver meter or bath tester, of some kind; there are several efficient and cheap ones made. By that means you would ascertain exactly the amount of silver your bath now requires.

A. B. C.—Your negative is manifestly much too weak. Try a more intense negative, print deeper, and tone longer.

G. S. S.—See Mr. Malone's article on printing by electric light in our last. If you send us a specimen of your difficulty in mounting your stereos, we can better help you.

L. D. S.—The neglect you describe is doubtless very annoying, and indicates bad management somewhere. We imagine, however, that it has been but an accidental circumstance. The tent of which you speak we know to be light, simple, and efficient. We shall probably describe it in our next.

S. Bourne.—Your view in Dovedale is very fine. We will insert your your name in the Exchange Club for large pictures.

S. R. G.—The use of sun printing for Woodward's camera is out of the question at this season of the year. Development printing is the only resource; it is difficult of course to get the best surface definition by this means; but we have seen some excellent prints so produced. Mr. Atkinson recommends the use of bromidized paper, we believe. We hope shortly to have the experience of some who have worked with the camera. We should have had before this, but for the unsuitable weather which the summer has presented for such experiments.

L. A. D.—Travelling should not injure your nitrate of silver bath; possibly it is growing weak and acid. 2. The paper to which you refer, probably *papier Rive*, whilst excellent as regards brilliancy of the print, has generally the fault of which you complain: it blisters. Use a little less alkali in your toning bath, that may help you a little; but as you state the blisters disappear when dry, and you get good prints, you have not much ground of complaint. The use of a strong bath and short floating aids in producing vigorous surface definition. With an eighty-grain bath, a shorter floating than five minutes should be sufficient. The difference of tone at the edge to which you refer, is probably due to an accumulation of silver at that point in draining. There is no danger in cutting paper with scissors after sensitizing, if you use ordinary care. 3. Four ounces of hypo to a pint of water is a good strength for fixing prints. The same, or a little stronger for fixing the negative. The toning bath recently given in our article "Dictionary of Photography," is the formula we have generally used, and with it obtain every variety of tone we wish. One grain of gold will tone a whole sheet of paper, or six whole plate prints.

F. E. G.—The cracking of varnish in the way you describe has been complained of repeatedly. It arises from the use of an unsuitable gum in the manufacture of the varnish. Probably the plates had been subjected to much alteration in the temperature; or they have been in a damp place and then in a dry one; and the gum having been somewhat absorbent of moisture, first expanded, and then contracted and cracked. If it be a "crystal" varnish, as we presume it is, and the varnish only be cracked, and not the collodion. remove the varnish by means of benzole or chloroform, and then varnish with another varnish. We have never heard of spirit varnish cracking. The stereographs possess merit and interest: the stains seem to be caused by an acid gum or paste used for mounting. You will best ascertain their marketable value by communicating with a wholesale dealer. But pray don't paint out the skies, and thus ruin the atmosphere in your pictures.

In Tenebres.—It would be no infringement of Mr. Woodwards patent for an amateur to adopt a larger condenser to Mr. Woodward's camera. There is no danger to either the negative or copying lens in such an adaptation, provided proper care were always used. As regards the negative it should never become heated at all, because it should never be placed at the apex of the cone of rays, passing through the condenser. Intensity of heat is only generated at the focus of the burning glass. This focus is, however, on the anterior lens of the combination in the copying lens, but the rays are not arrested and absorbed there; they pass on, and so produce no danger. Possibly in very cold weather it might not be wise to bring the concentrated rays of the condenser suddenly on to the copying lens, as a very slight sudden application of heat, and consequent expansion, might be possibly injurious.

W. G. G.—For procuring various samples of wood, such as you require for your experiment, we can only recommend you to apply to the nearest timber merchant, carpenter, or cabinet-maker, and who will doubtless supply what you want for a fair consideration. We are glad that you were able to profit by our information, and are obliged by your good opinion.

H. H. C.—Never use a white background, as it will always come out the colour of the face in the picture. A grey or brown is best. Brown paper is very good, or, colour your calico in distemper a light grey. The bath should be kept covered up. The blueness you describe probably arises from the iron developing solution coming in contact with cyanide, from imperfect washing between developing and fixing. Try a protonitrate developer to get better whites. Two thicknesses of yellow calico will exclude diffused daylight, but not direct sunlight. There is no "freedom" in writing to us, to excuse. We are glad to assist our readers.

X. Y. Z.—Probably the chemist of whom you have your nitrate of silver will purchase your chloride of that metal. If not, almost any refiner will purchase it. See an announcement in our advertising columns by Mr. Hearn.

Advertisements and Communications for the Publisher for the current number, to be addressed to the Office, 32 Paternoster Row, not later than 3 o'clock every Thursday. Post-Office Orders are to be made payable to Mr. Thomas Piper, at the Money-Order Office, St. Martin's-le-Grand.

THE PHOTOGRAPHIC NEWS.

Vol. IV., No. 116.—*November* 23, 1860.

CARBON PROCESSES AND THEIR INVENTORS.

In our remarks on this subject last week, we were anxious to give to Mr. Pouncy his full meed of praise as a persevering experimentalist, and we were careful to avoid denying him the credit of an independent discovery of the principles on which his process was based; our only aim being to affirm the equal claims of others who had been charged with appropriating his ideas. Our readers, who remember the history of the Carbon Process in connection with Mr. Pouncy, and the charges against the Photographic Society, and the Photographic press generally, for some supposed neglect of that gentleman's claims, will be somewhat surprised to learn that the process, even as practised by him, is not the discovery of Mr. Pouncy at all. We received, a few days ago, a letter from a photographer in Mr. Pouncy's neighbourhood, detailing the history of the process, and stating some facts very damaging to its *soi disant* discoverer—giving us, at the same time, full permission to publish them and to use his name in substantiation. We should have been unwilling, however, to refer to the matter further, but for the subsequent receipt of another letter, so modest in its statement of claims, which appear to have been so shamefully ignored, that we feel bound to publish it. It is as follows:—

"168, *New Bond Street, Nov.* 20, 1860.

"Sir,—As the carbon process appears to be agitated again, I will simply give you a few facts, of which you can make any use you please. It appears to me that those who are most tender when their own interest is affected, are most unscrupulous towards others. How very consistent of Mr. Pouncy to complain of having his 'brain sucked' when he was not the originator of the Carbon Process at all; for the action of the bichromate salt, with organic matter influenced by light, was known long before he dabbled with it. But if there is any merit in applying a known principle, I can certainly claim it, having produced the first picture by the process, and also those Mr. Pouncy triumphantly exhibited to the Photographic Society, and at Paris; though being his apprentice at the time, my name was never heard in connection with the affair.

"I have troubled you with these few lines, thinking it may interest you slightly to know the truth.—Yours, respectfully,
W. Portbury."

The first letter we received more than corroborates this statement. We should like to know how much of the £80 collected by Mr. Sutton, and of the 400 francs conferred by the Photographic Society of Paris, on Mr. Pouncy, has passed into the hands of Mr. Portbury. The correspondent to which we have referred, says—just five shillings!

In connection with the same subject, M. Joubert writes us the following letter, showing how far he is indebted to Mr. Pouncy:—

"Sir,—Your last number contains a quotation from a country paper, in which I am taxed with having copied Mr. Pouncy's process of carbon-printing, and I beg you will allow me to give that statement a short answer.

"It was not until long after I had been engaged in the process I am now practising of permanent photographic printing, that I saw for the first time a print of Mr. Pouncy's, which he was good enough to forward to me himself, with a letter, requesting me to send him in return a specimen of my own printing.

"Mr. Pouncy's proof showed such excellent qualities, that I procured a copy of his provisional specifications, to ascertain how he had proceeded; but I found that Mr. Pouncy and I had started from such opposite points, that not a particle of information thus obtained could have been of any use to me, even had I known his *modus operandi* some years ago, when I seriously took up the subject.

"The article also mentions my having expressed a wish to part with my process for a "consideration;" but I can easily give an explanation how this has occurred—although I have been distinctly asked whether I would part with the invention for a sum of money which, was even specified in writing, I declined, saying at the same time, that in the event of any public institution, or scientific body, thinking it worth while, after thoroughly testing the capabilities of the process, to make me an offer with a view of giving the public the advantage of the invention, I would not refuse; but would probably claim a handsome reward for trouble and expenses.

"The question has been many times put to me, Why I had not patented the process? My answer is this:

"I consider the present state of the law on patents to afford little or no protection to a patentee, except he happen to be rich enough to purchase, and dearly too, a protection which ought to have been secured to him in return for the fees, amounting to nearly *two hundred pounds*, in which a patentee is mulcted.—I remain, dear sir, yours faithfully,
F. Joubert."

36, *Porchester Terrace, Nov.* 19, 1860.

A NEW TONING PROCESS.

An entirely new process of toning silver prints was patented a few months ago in the United States, which has been the subject of repeated encomium by American operators in American journals. It was stated to be entirely without gold, so cheap that one hundred prints were toned by the expense necessary to toning one with gold. Very rapid, so that ten pictures could be toned in the time required to tone one with gold. And, with all, it was stated to be absolutely permanent.

Mr. F. B. Gage, one of the most experienced of American photographers, describes the tone produced as more like an engraving than a photograph; and adds, that unlike the gold bath, which often seems to impoverish the print in vigor and sharpness, this seems to give even greater sharpness to the print than it possessed before toning, remarking that a plain paper print so toned possessed more delicacy, detail, and sharpness, than he had ever seen in an albumenized print.

The manipulation is said to be "simplicity simplified." "We print the pictures," say the patentees, "about the same as for the old bath. Our toning-bath stands in a strong light, and the prints are toned in the same. The print is taken from the pressure-frame and *floated* across the bath, face downwards, as quick as the hand can carry the print; the face of which only is wetted. It is immediately removed, immersed in clean water, and rinsed. At this stage the colour is a brilliant purple, bordering on a blue It is now submitted to the hypo-bath."

The process is, as we have said, patented in the United States, and a provisional specification was lodged at the patent office of this country in March last. The further steps necessary to complete the patent have not, however, been taken; and, so far as this country is concerned, the protection has lapsed, and the process is the property of the public. The details of the process, as given in the specification, are very meagre, no proportions, whatever being stated, nor any manipulation described. The extract from an

American journal we have given above will supply some hints of the latter; and as for the former it must be a matter for experiment with those of our readers who are interested in it. As it stands, it is rather a queer mixture; but must be judged by results. We have not had time to try it; but hope to do so shortly. We shall be glad to hear of the result in the hands of any of our readers.

The words of the specification are as follows:—"The improved preparation or solution for toning photographic pictures, which forms the subject of the present invention, is composed of corrosive sublimate, tartaric acid, sal soda, hydrochloric acid, and aqua distillata. This solution, after well mixing, is left standing forty-eight hours, and after filtering is ready for use. The picture, when taken from the printing-board is passed through the toning-bath, then immediately immersed in a clean water bath, to give it a thorough rinsing. As a rule this will be sufficient to tone a picture; but when it is printed very dark it may be necessary to go through the same manipulation a second time. Care should be taken to have the print well washed before it is put into the fixing-bath.

"The advantages of the above toning solution, are—1st, that it greatly cheapens the process of toning pictures; 2nd. that the toning of a print by this solution is an instantaneous process, thereby saving a great amount of time; 3rd. that it gives a sharpness and distinctness to the picture; 4th. that it can be worked in a clear light without injury to the toning solution or print; and 5th. that the colours are permanent."

How far these claims are justified we hope to see.

INSTANTANEOUS PHOTOGRAPHY AND COMPOSITION PRINTING.

BY SAMUEL FRY.*

In the midst of our discussions of dry processes, the failure of one, the success of another, and the peculiarities of a third, it may not be amiss to halt a moment and consider certain advantages pertaining to the wet collodion process in its most sensitive form. I consider it an error of judgment on the part of those who would utterly repudiate either method of manipulation, in favour of the other, as each has, beyond doubt, great and manifest advantages for its own class of subject, and I trust to be able to show you this evening, to your satisfaction, that whilst, as at present constituted, wet collodion has unquestionably the most rapid action, and produces more atmosphere as a rule, that it is far from hopeless, to expect that ere long we may be able to prepare dry plates capable of producing all that wet collodion now does.

I have also in view, in troubling you with this paper, to impress on photographers the primary importance of introducing artistic feeling and true chiaroscuro into our landscapes, &c., rather than making that incubus of the art, sharpness, take the pre-eminence.

The mass of chalky white sky is a great fault in a fine landscape, and I have brought a few specimens to illustrate the improvement easily obtained by the very simple operation of printing in a cloud sky from a second negative. I will also explain the method I adopt of taking from nature these cloud negatives and adjusting them to various subjects.

I may perhaps commence by describing the chemicals and apparatus used by me for taking instantaneous stereoscopic and other negatives of the waves of the sea, copies of which are now in the stereoscopes before you, and also other large pictures on the table.

In making the bath, I use crystals in preference to fused nitrate of silver, and choose always a sample which has no perceptible odour of free nitric acid, as that would of course tend to retard the action. I consider the bath should certainly be of the strength of 40 grains to the ounce, and I have frequently, with advantage, used it with as much as 50, but there is with this strength a considerable inclination to attack the plate when kept for more than five minutes. I keep this bath carefully neutral, in fact, I have frequently, adding acid in proportion to the developer, had it with a slight alkaline reaction, but I do not recommend it in this condition, as being most difficult to manage, the slightest *soupçon* of diffused light in the camera or dark-room being enough to cause fogging. The collodion I prefer is that sold for positive photographs, and there are so many excellent makers in the market, that it would be invidious to specify any particular maker, but I strongly suggest it should be mixed not more than a week before using. Negative collodion may of course be used with perfect success, but most samples so rapidly lose their normal sensitiveness that I have found more difficulty in obtaining the best results with it than with positive. Of the pictures now before you the one taken with the shortest exposure is that numbered 2, the ground-swell, in which the breaking wave has thrown water high into the air, each transparent drop being accurately rendered in the photograph, and was done with Mr. Hardwich's collodion from a sample he prepared expressly for me; but the same collodion failed to produce an equally good result when mixed twenty-four hours, and I may say that having tried the negative collodions of the best makers, I am inclined for this special work to prefer a positive one, as being thinner, and thus giving a peculiarly smooth, even film, free from spots and blemishes, and above all more sensitive when developed with iron, which I generally use. It will occasionally occur when the light is not particularly brilliant that an iron negative will refuse to gain intensity on applying the subsequent negativing pyrogallic solution; but such is not, I think, frequently the case: when it is I have used, with much success, first a saturated solution of bichloride of mercury, and when equally whitened, wash and use a weak solution of hydrosulphide of ammonia, which gives a yellow image possessing much more printing power than a cursory inspection would lead one to suppose. Samples of such negatives are on the table, though in these the final solution of hydrosulphide of ammonia being too strong, they are almost too dense to print well.

A binocular camera is on the table, which has the interior arrangement of shutters I prefer, and use, for instantaneous work; by the slightest imaginable movement of finger and thumb the exposure is achieved. I am a sceptic with regard to those fabulously small fractions of a second, in which some would have us believe exposures are made and pictures taken, as I find much rougher methods of exposure even than those before you perfectly practical in taking objects in motion. In a recent letter from Mr. Wilson, of Aberdeen, whose charming works we all know, he tells me he covers his lenses with his own Scotch cap, and simply lifts it off and on again; if such simple means are so successful for obtaining good pictures, surely there can be no advantage in having any of the costly and complicated affairs which have been recommended in the way of sliding shutters, which are almost certain to stick at the critical moment from damp, or else they shake the camera in moving.

I have invariably used a pair of double lenses, made for me by the late C. Shepherd, and think them equal, at least, to any made by far more expensive makers.

I place a stop of $\frac{3}{16}$ths of an inch between the lenses, which will bring foreground and horizon into perfect focus.

The iron developer I use is—

Iron	20 grains.
Ac. Ac. Beaufoy	1 drachm.
Ac. Soda	1 grain.
Aq. dist.	1 oz.

I pour a considerable body of this in sweep over the plate, and let it develope the picture as far as it will, sometimes adding a few drops of a fresh solution of nitrate of silver, not having any iodide in it. I then carefully wash the plate with a good stream of water, and proceed to densify with

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* Read at the Meeting of the South London Society, held on the 16th instant.

Pyrogallic	3 grains.
Ac. Ac. Beaufoy	1 drachm.
Water	1 oz.

or—

Pyrogallic	3 grains.
Citric acid	1 grain.
Water	1 oz.

As a general rule, I can at once obtain sufficient density on adding a few drops of the above-named solution of new nitrate of silver, but when it fails I use, as hinted before, the bichloride of mercury, followed by hydrosulphide of ammonium.

I conduct the intensifying in daylight, but not in strong light.

I will now speak of three small paper photographs, before you, representing sea, and clouds, shipping, &c., also moving figures on the land, these were done with dry plates, prepared by Taupenot's method. I wish I could say they were by Fothergill, which I much prefer for its certainty of result and simplicity, but I confess I have not yet succeeded in producing quite the same degree of sensitiveness in this latter though from recent experiments I am persuaded it is to be done, and intend next season to pursue it. They perhaps scarcely fulfil the desired conditions of instantaneity being done with a ¼ Ross lens, double combination, and stop of two inches; but the exposure was undoubtedly sufficient, and proves that more is to be done in that direction. The clouds are printed in four different negatives, and add very greatly to the general effect, and I will now describe the means I use for taking the cloud negatives, some of which are in the room.

If for the previous operation the highest possible sensitiveness is required, here we have the very reverse, and I therefore use old port-wine-coloured collodion, an acid bath, and a long focus landscape lens, and a weak developer. The exposure is generally nearly instantaneous, and it suffices perfectly to cover a cloth over the lens and lift it during exposure.

To develope I use half a grain of pyrogallic acid, 1 drachm of acetic acid, and 1 oz. of water, and bring it up very slowly; by this means very admirable clouds are produced, possessing wonderful half-tones, and yielding every shade from intense white to black. I usually take the cloud negative not larger than 5×4, then print a transparency on a Fothergill plate, and enlarge that up to 18×15; in the enlargement it gains in detail, and acquires exquisite softness and beauty, and from a negative of that size may be printed different skies into twenty or fifty other pictures; each portion of sky may, by judicious printing, be made to yield different characteristics suitable to the subject to which it is joined.

I will in a few words explain my method of composite printing, as shown in the circular picture, The Break in the Clouds, and also The Heavy Sea at Brighton now before you; the latter picture is printed from three negatives, which I have here. The first to be printed is the foreground of boats, and whilst this is in the frame, a mask of cardboard cut roughly to the shape of the upper edge of the negative, and edged with cotton wool, is laid outside the pressure frame, over that part of the prepared paper which is intended to be kept white: the frame with the mask in it is then placed in diffused light. To examine the printing, I invariably bring the frame into the dark room, or the pure white of the picture will be degraded; when this part is sufficiently done, I take the sea negative, and which has a light paint mark on the lower part, corresponding with the outline of the previous plate; the plate being laid on the paper in proper position as shown by this line, has two masks superimposed on it, the lower one covers the part already printed, and the upper that reserved for the sky. Again the frame is exposed to light until the central strip of sea is printed; then the cloud negative is placed on the paper, and a mask covering both the lower parts is placed in position. The operation is much more simple in reality than in description, and if ordinary care be taken, no part of the picture can overlap the other. By this means highly artistic effects are produced, such as can scarcely be obtained in a simple negative. I will now say a few words with respect to printing clouds into architectural and landscape pictures, which I do by making lightly on the back of the cloud negative, a line corresponding with the outline of the picture, the two are then placed in the frame, and a mask placed over the landscape, or building already done, the cotton wool at the edge of the mask, and the thick glass of the pressure frame combine to prevent any hard line round the picture.

Gentlemen, I have to thank you for the kind attention which you have given me, and though there are many present to whom anything I have read to-night must be perfectly well known, still I trust that the discussion raised upon points I have alluded to may not be without its advantages.

A SIMPLE AND EFFICIENT PRESERVATIVE PROCESS.

BY THOMAS SEBASTIAN DAVIS.*

The glass plate is to be covered with a good negative view collodion and excited in the usual 32-grain nitrate of silver bath. Upon its removal the free nitrate of silver is to be washed away with an abundance of filtered river or rain-water, poured over its surface. The film is then to be covered with a preservative solution containing a mixture of grape sugar, gum, and diastase, as naturally mixed in the dried grape. It is to be extracted by the following method: —take four ounces of stoned raisins and mix them with an imperial pint of boiling water; as soon as cold, strain through fine muslin, and finally filter through ordinary filtering paper. The washed plate is to be covered twice or thrice with fresh quantities of this extract, and afterwards gently washed in an upright bath or in any other convenient manner. The object of the latter process, is to remove the greater portion of the preservative solution from the surface of the film, without disturbing that which is retained within its interstices. The development is to effected with—

Pyrogallic acid	1½ grains.
Citric acid	½ grain.
Water	1 ounce.

previously mixed with 20 minims of a 16-grain solution of nitrate silver.

The usual protosulphate of iron fluid, is somewhat to be preferred in cold weather, but the negative will require to be slightly intensified with the pyrogallic developer. It is to be fixed with hyposulphite of soda, dried with a gentle heat and varnished.

SCIENTIFIC GOSSIP.

The popular subject of adulteration is one which affects photographers in a peculiar degree. As men they share with the rest of the world in the inconveniences occasioned by eating alum and ground bones in their bread, drinking coculus indicus, green vitriol, and similar poisonous abominations, in their beer, or imbibing a decoction of floor-sweepings, coloured with gambouge and prussian blue, and made to cohere with gum into the semblance of tea-leaves. But whilst he is thus being slowly poisoned in company with his fellow-mortals, he has to submit to another and to him more serious kind of adulteration. His chemicals are treated by the manufacturer no better than his bread, beer, or tea; and we think that, to an enthusiastic photographer, the annoyance of having a series of otherwise beautiful pictures spoiled, owing to some chemical, purchased as pure, being sophisticated with an article having a totally different effect to the one he wishes to produce, is infinitely greater than that which he experiences when he finds out that the staff of life contains rather more slow poison than he has before suspected. For this reason the subject of the adulteration, intentional or accidental, of the chemicals used in photography, will always be a subject which we shall place prominently before our readers—an easy and novel means of detecting some common adulteration being, in our opinion, of more value to our *confrères* than even the discovery of a new dry (or sticky) collodion process. At the last meeting of the Chemical Society a very interesting note was read by Pofessor Bolley, which places us in possession of a beautiful and easy process for detecting the presence of water in ether. The subject was on some discrepancies in the statements of Pelouze and F. Mohr, respecting the solubility of gallotaunic acid in ether. Perouze considered the mixed liquid obtained by treating nut-galls with ordinary ether in a displacement apparatus, as a concentrated aqueous solution of tannic acid, and the lighter liquid which separates from the former and floats over it, as ether, holding small quantities of tannic acid and colouring matter in solution. Mohr, on the contrary, has represented the thick liquid as a concentrated solution of tannic acid in ether. Professor Bolley found that neither of these statements was strictly correct; the thick viscid liquid being a solution of tannic acid in a mixture of equal volumes of ether and water. He found that absolute ether dissolved only 0·206 per cent. of tannic acid at 5° c. From the above a very ready test for the presence of water in ether may be obtained. It is only necessary to add a few grains of tannic acid to a drachm or two of the suspected sample of ether and to shake well. After standing for a few hours, if the acid has sunk to the bottom as a dry powder, the ether is free from water; but if, on the contrary, the tannic acid has a damp wet look, or has assumed the form of a viscid mass, the presence of water in the ether may be taken for granted.

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* Read at the Meeting of the South London Society on the Evening of Thursday, the 15th inst.

We have also met with a few useful hints respecting the detection of some of the common adulterations of chloroform. The foreign ingredients most frequently met with are alcohol, aldehyde, hydrochloric, and hypochlorous acids, together with some compounds of methyl alcohol may be detected by adding one or two crystals of chromic acid to two drachms of the chloroform; should alcohol be present, the chromic acid is soon reduced to the state of green sesquioxide of chromium. M. Besnou, who has just published some interesting remarks upon chloroform, states that bichromate of potash certainly affords a very good means of recognising the presence of alcohol; it requires to be used with some care in order to avoid incorrect results. He recommends that a very small crystal of bichromate of potassa be put into a glass test tube, next add four or five drops of concentrated sulphuric acid, and stir with a glass rod, the ruby colour of chromic acid will instantly appear, when a few drops of water must be added; next add about a drachm of chloroform, shake quickly for twenty seconds, and allow the whole to rest for some time. The rich green of sulphate of chromium soon appears, and if the proportion of alcohol amounts to 5 per cent., it is deposited as a green layer at the bottom.

Alcohol, another important photographic chemical, may be tested for water by shaking up with a few drachms of it a little sulphate of copper, which has been powdered and gently heated till the blue colour is replaced by white. If there be an appreciable quantity of water in the alcohol, the whole powder reassumes its blue tint. This was for some time thought to be a very delicate test for the presence of water in alcohol, as it was stated that none but absolute alcohol would retain the copper salt white under it for any length of time. We have, however, found that this statement is not strictly correct. Alcohol containing a trace of water will still act towards sulphate of copper as if there were none in it; but for all photographic purposes this test may safely be used. The photographer does not require absolute alcohol; even were he to procure some, he could not keep it so for a week, and therefore any test exceeding in delicacy the sulphate of copper one would be needless. The operator may feel quite satisfied that if his alcohol does not turn white sulphate of copper to blue, after six hours standing in contact, it is quite strong enough for any purpose he may require, and much stronger than that in general use.

We recently mentioned that, acting upon a discovery of Bunsen and Kirchoff respecting the spectra given by coloured flames, the presence of two rare elements, lithium and strontium, had been detected in London water. We have now to announce a far more important discovery, namely, that of a new element altogether; it has been detected by its effect upon alcohol flame, when viewed by means of the prism, in the mineral water of Kreuznach, in the saline water of Dureckeim, and in one of the sources of the Bade. The chloride of the new metal gives a very interesting spectrum formed of two blue fringes, of which one coincides with the blue band of strontium, and the other is situated a little above the first.

Persons who have had much to do with platinum vessels cannot fail to have noticed with pain the gradual tarnishing which comes over the surface of the metal after repeated ignition. This grey coating has given rise to much annoyance and solicitude amongst chemists. Indeed, it has often been asserted that the use of Bunsen's burner is inadmissible, owing to its deterioration of the platinum crucibles submitted to its heat. In conjunction with Pettenkofer, Erdmann has instituted a series of experiments which have left but little doubt that the phenomenon in question depends upon a molecular alteration of the surface of the metal. If a weighed polished crucible be ignited for a long time over a Bunsen's burner, the position of the crucible being changed from time to time in order that the greatest possible portion of its surface should be covered with the grey coating, and its weight be then determined anew, it will be found that this has not increased. The coating cannot be removed either by wetting with bi-sulphate of potash or with carbonate of soda. It disappears however when the metal is polished with sand; the loss of weight which the crucible undergoes being exceedingly insignificant, a crucible weighing 25 grammes having lost hardly half a milligramme. When the grey coating of the crucible is examined under the microscope it may be clearly seen that the metal has acquired a rough, almost warty surface which disappears when it is polished with sand. Platinum wires, which are frequently ignited in a gas flame—for example, the triangles which are used to support crucibles—become as is known, grey and brittle. If such wire is strongly and perseveringly rubbed with sand, the cracks disappear and the wire becomes smooth and polished; for the grains of sand, acting like burnishers, restore the orginal tenacity of the metal, very little of its substance being rubbed off meanwhile. If each commencement of this loosening is again destroyed, the crucible, will be preserved unaltered, otherwise they must gradually become brittle. The sand used should be well worn. When examined under the microscope no grain of it should exhibit sharp edges or corners; all the angles should be obtuse. This rough method of treating a valuable and delicate instrument may at first sight appear dangerous, it is not so, however, in reality. We have employed it for some years upon our own platinum crucibles and dishes in our laboratory, and have every reason to feel satisfied with the results. The platinum apparatus has not shown any undue signs of wear, whilst a crucible belonging to a friend purchased at the same time as our own is very much worn and deteriorated.

DISCOLORING OF THE NITRATE BATH FOR ALBUMENIZED PAPER.

Those who sensitize large quantities of albumenized paper, and more especially highly glazed samples, find a very considerable loss of time, much trouble, and more waste of silver, from the colouring produced by the action of the albumen on the sensitizing bath; the usual means of removing this colour is by kaolin, a white powdered clay, which consists to some extent of carbonate of lime. How far this element acts in the decolourizing process I will not say; but I am inclined to think it plays some part.

The action of kaolin is very effectual, but wastes silver by absorption; and time, by clogging the filter. My object in this note is to point out a very simple means I have employed for three years, to prevent the sensitizing bath from even discolouring; and, on the principle of prevention being better than cure, I think it has but to be pointed out to be generally adopted. My plan is to mix the silver for the bath with common instead of distilled water, its action is thus:—

On making the mixture, a white, impalpable, cloudy precipitate is formed, which gradually settles down, and must on no account be filtered out, but allowed to remain by leaving a small quantity of solution in the bottle when about to use it. The carbonate, of which this precipitate is chiefly composed, appears to be so active in decolorizing as to prevent the slightest trace of colour being found. When my bath is done with for the day, it is poured back on to the deposit left in the bottom, and well shaken up; the consequence is my bath is always as clear as spring water, and others to whom I have recommended it find the same.

Samuel Fry.

EXPERIMENTS IN THE PROCESS OF MESSRS. PETSCHLER AND MANN.

BY J. KIBBLE.*

The intense interest excited by the communication of Messrs. Petschler and Mann, at one of the Manchester Photographic Society's meetings, on the destructive influence of a coating of chlorided albumen when in contact with the ordinary washed sensitized iodide of silver surface, induced me to make a few experiments, to satisfy myself to what extent the chloride rendered iodide of silver non-sensitive to light, as, from former experiments on the destruction of actinism, I had arrived at a conclusion somewhat different to the general opinion formed by their experiments. So as to prevent any misunderstanding of the few remarks I am about to make, I may state that plates prepared as follows, viz., sensitized washed, coated with chlorided albumen (two grains to one fluid ounce), dried, exposed for several seconds to the influence of unobstructed daylight, immediately washed to remove the albumen; exposed for two minutes in the camera against an object; after exposure, flooded all over with a fifteen-grain solution of nitrate of silver, developed with the ordinary protosulphate of iron developer—will, in about one minute, be as free from all fogging as if the sensitive surface had been subject to actinism in the camera only. Yet, notwithstanding, as my after experiments will prove, the iodide of silver *is* sensitive to light when in contact with chlorided albumen; but is so far retarded by the chloride on washing, that an image formed in the camera, subsequent to washing off the albumen, will completely develop with a proto-salt of iron, before the previous action of light on the unwashed plate has time to manifest itself. In proof a sensitized plate, washed, coated with the chlorided albumen, after being drained and dried by artificial heat in the dark chamber, and, while still warm, exposed in the camera for two minutes against a building about fifty yards distant, immediately on being taken from the slide, was washed under the water tap for one minute; a fifteen-grain solution of nitrate of silver was then poured over and off it; the iron developer being applied, in about three minutes the high lights of the image made their appearance; in about two more all the details were *distinctly* visible. Although by no means such a negative as an aspirant would relish, it was quite sufficient to prove that iodide of silver is sensitive to the actinic rays when in contact with chlorided albumen.

These statements may appear a little paradoxical at first, but can be explained in a very simple and satisfactory manner. Imagine a sensitive surface (such as the ordinary wet process gives) to be exposed in the camera *twice*, each time to a different object; the first exposure to be one *second*, the next one *minute;* it is quite obvious, on the developer being applied, the longest exposed will make its appearance and thoroughly develop before the slightest trace of the shortest exposure becomes visible. Now, if the developing be discontinued, it might be said the short exposure had not any effect: neither has it, as far as visibility is concerned; but had the development been continued, it assuredly would have manifested itself, and a confused image would have been the result. This, in one sense, I consider quite analogous to the unwashed and washed collodio-albumen plates, the whole being caused by a mere difference or increase in the time of development: in one instance, by the retarded chloride on the *long* exposure; in the other, the *short* exposure acting similarly to a retarder in giving slow development. The actinism under exposure of unobscured daylight is so far destroyed by the act of washing off the chlorided albumen — which will, on entering into solution, exercise its maximum chemical effect—that an image formed in the camera by a few seconds of action on the *washed* iodide of silver will, under the developer manifest itself, and thoroughly develop without being interfered with by the actinism of exposure to open daylight, which is retarded, or partially destroyed, by the chloride, in addition to that, the dry iodide of silver not being so sensitive. But to this there is a limit, as the following highly-interesting experiment will prove:—Expose one of the unwashed collodio-albumen plates (which has been prepared in the dark chamber) for *four* minutes to the influence of an image in the camera. Having done so, wash it under the water-tap for one minute, and again expose in the camera to the same object; but this time let the plate occupy a position at a right angle to what it did formerly, and let the exposure be *one* minute, or one-fourth of the previous exposure. This effected, pour over the plate a little of a fifteen-grain nitrate of silver solution: after having inclined it in all directions, pour it off, and flood all over with the iron developer. Now mark the result: towards the expiration of two minutes two images become visible, at a right angle to each other, as nearly as possible of the same intensity.

After having developed for two minutes, should the image not be bold enough, wash off the decomposing fluid, and repeat with silver and iron alternately until satisfied. The specimen I now produce was done exactly as given. You will observe there are four different specimens. The first was exposed in the camera for two minutes, with the chlorided albumen in the *wet* state over it—a very satisfactory proof that even the wet chloride is only a retarder. The second is the same in every respect, but exposed twice to the same object:—first for *three minutes* in the unwashed state; the second time for *ten seconds* AFTER being *washed*—the plate also at a right angle to its former position. You will observe the longest exposure under the action of the chloride has developed without any interference from the short exposure on the washed surface; but in the third instance the result is very different, although all but the time of exposure is identical. Four minutes' exposure of the unwashed, and one minute of the washed, give as nearly as possible the same result: both images appear equally distinct. The fourth specimen differs from all the others in one respect only. After exposure, instead of washing with water, a weak solution of nitrate of silver was used for that purpose; the object being to convert the chloride of sodium into chloride of silver in the act of solution, so as, if possible, to destroy the action of the salt on the latent image. In this instance, also, the image developed but slowly; indeed the obstruction presented to the developer by the coagulated albumen holding chloride of silver embodied in it rendered the experiment comparatively worthless. To obtain satisfactory results, the chlorided albumen should be thoroughly washed off previous to using a developer which contains silver. The sixth plate, you observe, is an ordinary collodio-iodide of silver (no albumen), which was washed; and, after drying by artificial heat, exposed in the camera for two minutes; taken from thence, steeped in water, exposed again for *one* minute, at a right angle to former position, then flooded with weak nitrate of silver. On applying the developer, both images appear simultaneously, and of nearly equal force. In a former experiment, in which the times of exposure were the same, the one image came out much in advance of the other. As far as these experiments go, the dried iodide of silver appears to have lost one-half of its sensitiveness which it gains on being wetted. It is more than probable both states have lost their sensitiveness to a certain extent by the drying.

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* Read before the Glasgow and West of Scotland Photographic Society, on the Evening of November 1st.

The day on which these last experiments were made was so dull from fog that distant objects could not be taken with the camera; hence the reason that a lithographic portrait was made use of. Should similar experiments give similar results with others, the question naturally suggests itself—Will this process be suitable for instantaneous results? This I leave for those who pursue this fascinating science to ascertain. It must be borne in mind that all of the above experiments were exposed and developed immediately after preparation. It is possible, indeed highly probable, that sensitive surfaces which have been exposed to the influence of light, and retained in the dark chamber or box for days previous to development, may have the action, which in my experiments is only retarded, wholly destroyed by the prolonged action of the moist chloride. But that point also I leave for some of you who have better opportunities than I have to investigate.

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 21st November, 1860.

Certainly the most attractive object in Paris, now that the Empress has gone to Scotland, is the life-sized portrait of the Emperor. This magnificent production, the work of Messrs. Mayer and Pierson, has excited the curiosity of every one: not alone the gaping crowd who run after every novelty, but of sedate artists and amateurs, who go to scrutinize this new photographic phenomenon. If you follow the crowd that throngs the Boulevards every fine evening, you are sure to find yourself stopped before the atelier of Messrs. Mayer and Pierson, where, illuminated by two powerful reflectors, stands this gigantic photograph of the Emperor, enlarged from the negative from which the *carte de visite* that must be quite familiar to you, is taken. Every photographer, even he of the 'six sous,' feels proud of this achievement; the dignity of his art is raised, and he holds his head aloft, saying, "see what *we* can do, but this is—*nothing* to what we shall do."

Extremes meet in photography as in everything else. But there are artists among us who avoid these extremes, and adopt a medium scale of production in artistic photography, no less excellent or attractive. Count Aguado, a distinguished amateur, after proving his skill in colossal photography, has abandoned the extreme scale, and now contents himself with a medium size of pictures, which possess merits that enable them to enter into successful competition with works on any other scale. At the last meeting of our Photographic Society, the accomplished Count exhibited some very charming pictures of rural subjects, of which the engravings from Rosa Bonheur's pictures will give you a very good idea; they also are obtained by being amplified from stereoscopic negatives.

These amplified positives are, however, amenable to criticism. The artistic eye detects certain imperfections which are due to the imperfections of the magnifying apparatus. This was fully explained by M. Bertsch in a paper which appeared in the Photographic News of 30th March last. When by means of an ordinary lens, however excellent it may be, we focus a portrait or landscape on the ground glass, we are apt to be satisfied with an image, the sharpness of which is more apparent than real. The coarse grain of the ground glass does not permit us to attain the most perfect focus, and it is only by means of special appliances that it can be realized. The consequence is, that the picture obtained on the sensitized film substituted for the ground glass, sharp in the smallest details the eye can perceive, still exhibits some defects, aberrations which remain latent, and only become apparent when the picture is amplified. When we cause a bundle of luminous rays to pass through such a negative, the defects in it become exaggerated, by being made to occupy a larger surface, and consequently manifest to the eye in the resulting positive. Besides, in amplifying these negatives, methods of lighting them are often employed which transmit oblique rays, which, in consequence of the irregularity of their path, do not fail to produce effects due to diffraction. To overcome these effects, the negative must be illuminated by parallel rays. But above all, we must make use of lenses that will admit of our obtaining a perfect focus, and this is realised by the automatic camera proposed by M. Bertsch, which was described in the Photographic News of 6th July last. Since then this ingenious artist has endeavoured to complete the outfit necessary for a peripatetic photographer, by the contrivance of two portable laboratories: the one intended for the manipulation of wet collodion plates in the open air, and the other for working dry plates. The first, furnished with yellow glass, permits of the introduction of the hands through black sleeves furnished with india-rubber bands. It contains the camera, chemicals, glass plates, dishes, (which for these little plates are very insignificant in bulk and weight) and all the operations of sensitizing, developing, fixing, &c., can readily be performed within it, while it only measures 16 inches by 8 inches. The second laboratory is still smaller, as it is only used to put the dry plates into the camera, which is within it, as all the subsequent operations can be deferred till the photographer reaches his operating room. By these ingenious combinations, it becomes possible for the travelling photographer to obtain the most numerous and varied series of subjects in broad daylight with the utmost facility.

Although this subject does not present much novelty, I have dwelt upon it somewhat at length, because I think the future of photography lies in the direction of miniature negatives and amplified positives. Nothing seems wanting to render this result sure and easy of attainment, except a well constructed enlarging apparatus. The solar camera as now presented to us, excellent though its results may be, is far from being the perfect instrument required to satisfy the artistic photographer. M. Bertsch has remedied its defects in his automatic camera, and accompanying amplifying apparatus, and when they are introduced into commerce, we may expect the revolution in photography, so long eagerly anticipated, will be accomplished.

I lately visited the paper manufactory of Essonne, and am enabled to lay before you some details of the processes employed for sizing paper, which may not prove uninteresting in a photographic point of view, seeing the important part paper performs in our art. The sizing introduced into the pulp of the paper is an animal or vegetable adhesive material, which is added to the vegetable fibre to secure its cohesion, to increase its strength, and to give a degree of impermeability to the paper. In this manner we repeat, after a fashion, the process of nature in uniting vegetable fibres together, by means of gum, to form the organs of plants. For such paper as is not subjected to uses requiring great tenacity, or impermeability, sizing is not required; thus a large quantity of the printing paper used in this country is unsized. But writing-papers and photographic papers require to be strongly sized.

In some paper-mills animal glue, and a size composed of resin-soap is used, and the paper is sized after it is formed into sheets. In others, as in France generally, and at Essonne specially, the following sizing material is mixed with the paper-pulp. Resin obtained from Bayonne, or the United States, is put into a moderate sized boiler, and melted; then a solution of soda and lime is added; and thus a resin-soap is formed. This soap is dissolved in boiling water in another boiler, and conducted into large reservoirs, where it is left to deposit the impurities it may contain. On the other hand, a paste of starch and a solution of alum, is prepared; and when the paper-pulp is ready the resin soap is first added to it, and then the starch.

M. Terreil, in repeating the interesting experiments of Loewel on the crystallization of supersaturated saline solutions, has discovered that they do not crystallize when they are in contact with bodies in a certain condition, which must be the same as that in which the supersaturated solution also is. It is also remarked that all bodies which make supersaturated saline solutions crystallize, lose this property when they are slightly heated; and they retain this inactivity for a long time, especially when protected from currents of air. All bodies, soluble in supersaturated saline solutions, produce crystallization when thrown into it, and the solution of these bodies is accompanied by an elevation or a reduction of temperature. These same bodies lose this property of producing crystallization when they are previously heated to 100° F., and cooled out of the influence of currents of air. Bodies insoluble in supersaturated solutions produce crystallization when they are thrown into them in the ordinary state; but they lose this property when they have been previously dipped in distilled water, or slightly heated previous to the experiment, and cooled out of the reach of currents of air.

Some drops of water at freezing point, thrown into a supersaturated solution, do not cause crystallization; but a small piece of ice causes it to crystallize immediately. The crystallization of supersaturated liquors, at the temperature at which water possesses its maximum density, is a very remarkable fact.

When a thermometer, previously moistened to prevent its causing crystallization, is immersed in a supersaturated solution of sulphate of soda, prepared thirty-six hours previously, we remark that the temperature of the solution is always from ½ to 1 degree above the temperature of the air and water placed under similar conditions. We must sometimes wait fifty hours before the liquid assumes the ambient temperature.

When we put a flask, containing a supersaturated solution of sulphate of soda, into pounded ice, the temperature of the solution, after falling, remains stationary for several hours, at 5° to 6° C above freezing point; but always slowly descending to 4°. 2C: at this temperature crystallization takes place with remarkable rapidity, and the thermometer riseses to 25° C.

If the pounded ice be replaced by a frigorific mixture, the temperature of which is—15° or—18° C, the same phenomenon takes place a little sooner, and at 4° 2 above 0°. C the liquid crystallizes.

These experiments show that the phenomena observed in supersaturated saline solutions are not due to the causes to which they have hitherto been attributed.

Proceedings of Societies.

South London Photographic Society.

The monthly meeting of this society was held in St. Peter's School-room on the evening of November the 15th instant. The Rev. F. F. **Statham**, B.A., F.G.S., occupied the chair.

The minutes having been read and confirmed, some specimens by Wilson, of Aberdeen, and Rejlander, were handed round for inspection, and Professor Hunts's work on Photography was presented to the society's library by Mr. Davis.

The **Secretary** said the Experimental Committee had commenced their labours: they were directing attention to the possibility of discovering an instantaneous dry process, and had already made several interesting experiments. As yet, however, they had no results ready for publication; but he hoped that at the next meeting, Mr. Hannaford, Secretary of the Experimental Committee, would have a paper ready, announcing the result of their researches. He would now read a letter from Mr. Clarke, whose paper on "The Photogenic Action of Colour" was read at the last meeting. On that paper Mr. Shadbolt had made some comments in a recent article in the *British Journal*, and as, although Mr. Shadbolt was a member, this might be said to be his first appearance amongst them, he would read those remarks. Mr. Wall then proceeded to read the extract in question, which referred to the omission, in Mr. Clarke's paper, of any description of the sensitizing materials employed in certain experiments, an omission which Mr. Shadbolt thought nullified the value of any observation on the phenomena described. As Mr. Clarke was unable to be present at the discussion of the subject, which was to take place at that meeting, he had sent some observations on this omission, which he desired the Secretary to read to the meeting. The letter, after some preliminary observations proceeded:—"In the first place the editor calls my attention to the fact of my not mentioning what sensitizing materials were employed, and more particularly refers me to my last experiment, viz., the difference in the action of light by transmission through different coloured glasses on albumenized paper and collodion, and asks if the materials "were identical in both cases?"—my answer is, they were not; the albumenized paper was sensitized in a solution of nitrate of silver, as usual, of the strength of 80 grains to the ounce, whilst the collodion was iodized chiefly with the iodides of potassium and ammonium, with a slight trace of bromide, and sensitized in the usual negative bath; the whole of the experiments referred to in my paper were made with the same collodion and bath, whilst the light in each case was (as nearly as could be guessed) of the same intensity. Reference is also made as to "the nature of the colouring matter employed;" of this I can say little, for I merely ordered the glazier to send me some strips of different coloured glasses, such as is commonly used for windows. The substances employed in the manufacture of this glass I am unacquainted with, although this information might be obtained, and as I intend giving this subject further consideration shortly, I shall feel great pleasure in laying the results of future experiments, before the members of this Society."

The **Chairman** made some remarks on the importance of noting and recording the precise conditions under which experiments on this subject, as all scientific enquiries were conducted. In regard to the question of producing the natural colours by means of photography, he would again call attention to the fact, that colour was due to certain conditions of surface. He remembered on one occasion being present in Mr. Shadbolt's dark-room when he was operating. On that occasion some of the films certainly gave traces of colour for a few moments, which disappeared, however, on drying. He thought that it would be a right direction for experiment to endeavour to find some method of preserving the same condition of surface when the picture was dry as when it was wet. It was well known that by altering the surface of anything, the colour was altered also. A piece of red sealing-wax, for instance, was no longer red if it were reduced to a fine powder. The colour of the cloth on the table was green, but that was simply in virtue of its possessing a surface which absorbed the red rays, and reflected the blue and yellow rays of which the light they then possessed was composed. Alter the nature of the light by which the cloth was illuminated, use a light which was not composed of rays of these three primary colours, red, blue, and yellow, and the colour of the cloth would be altered. Or change the surface of the cloth so that its power of absorbing and reflecting light should be altered, and a different colour would be the result. It was important in any researches as to the production of natural colour in photographs that the fact should be borne in mind that it was a question entirely of surface. He would be glad if in its proper order the subject were brought under the attention of the Experimental Committee.

Mr. **Ackland** wished to have the attention of the meeting for a few moments on a subject which concerned himself and the members. He said—

At the last meeting of this society, during the discussion that followed Mr. Hughes's paper on the "Mechanical Adaptation of

Portrait Lenses to View Purposes," I was asked by a member how photographers could tell when the axis of a lens was central, and in reply I stated that it was a "trade secret known only to a few."

In the *British Journal of Photography* for November the 1st, Mr. Shadbolt states that in making this remark I must surely have been joking, and he then proceeds to divulge this secret, lest the readers of that journal should have a laugh at his expense for allowing such a statement to remain unnoticed.

[In order that our readers may understand this allusion, we must here quote the explanation given by Mr. Shadbolt of the method of centring lenses. He says:—

"While the brass mounting of the lens is still in the lathe, and the lens itself inserted, a lighted candle is placed at a distance, in the direction of the axis, without any particular regard to accuracy of position. A piece of white card is then held behind the lens, so as to get the image of the flame in pretty correct focus: then by causing the lens to revolve in the 'mandril,' by simply working the 'treadle,' it will be at once seen whether the lens axis is properly centred; for, if this be the case, the image of the flame will remain *perfectly stationary*, notwithstanding the rapid revolution of the lens—if not, the image will have a rapid flickering movement, the amount of which *increases* in direct ratio with the eccentricity of the axis. The same test applies also to the double combination; but in this case any eccentricity is of far greater importance, because infinitely more detrimental than in a single combination. In the latter slight eccentricity is of little consequence; in the former it would be fatal to anything like correct performance. It must be borne in mind that, in examining a lens for this quality, after it has been removed from the lathe in which it has been finished, care must be exercised in order to ensure its being properly screwed into its place of adjustment, as otherwise the error of adjustment in position will give the appearance of its being improperly centred; and here again the portrait combination requires more care than that for views—the test applied being, in fact to the *axis of the lens* with reference to the *centre of motion*."]

We now resume Mr. Ackland's reply:—

In reply to those remarks I beg distinctly to state that no photographer can determine whether a portrait lens is properly centred by the method proposed for that purpose by Mr. Shadbolt, even if he possesses a good lathe and sufficient mechanical skill to use it properly.

I do not attempt to deny, but that it would be possible to try this plan to ascertain if a "view" lens was properly centred, but I deny that it is at all applicable to the portrait combination.

The remarks that called forth this enquiry at the last meeting were made by myself in reference to PORTRAIT lenses, and the gentleman who made the enquiry no doubt referred to the portrait combination; and I again repeat that the plan I practise to determine the proper centring of lenses is a secret quite unknown to many lens makers, and even Mr. Shadbolt himself.

Whenever I meet with a number of lenses by the same maker, I carefully apply my test, and it frequently happens that not more than one lens out of six is centred properly: hence I infer that such a maker is ignorant of the plan I use, for did he possess it we may reasonably suppose he would apply it, and thus improve his productions without increasing their cost.

There are two makers whose lenses are properly centred; hence I infer they know this "trade secret." I make these remarks lest the members of this society should imagine that I had been (as Mr. Shadbolt suggests) joking at their expense, and to disclaim being the inventor of this "secret."

The CHAIRMAN said he thought Mr. Ackland had taken Mr. Shadbolt's remarks too literally. The process that gentleman had described was doubtless only intended as a rough approximation to accuracy, and had no pretension to mathematical precision. Mr. Ackland was probably referring to scientific or mathematical truth, whilst the plan Mr. Shadbolt had described could only refer to a rough general idea.

Mr. ACKLAND said the plan described by Mr. Shadbolt was at once troublesome and useless. Few photographers possessed the facilities referred to; still fewer could use them, and if they could they would find them utterly useless for testing the centring of a portrait lens. The method to which he referred was not a secret of his own, nor had he made any boast of it It had been published in the English language many years ago.

Mr. HUGHES could not sit still and hear the Chairman's remarks without entering a protest against them. It was tantamount to giving the palm of accuracy to one method and condemning the other, when they had not the two before them to compare. They certainly could not give the palm of accuracy to Mr. Ackland's method when they had no knowledge of it at all. He believed that the method described was that adopted by opticians. If a lens were fixed to a lathe and an image brought to a focus by the lens; and the lathe were then made to revolve, the image would revolve in just such ratio as the centre of the lens and the axis of the lathe differed. If the centre of the lens and the axis of the lathe were coincident, the image or spot of light focussed would, when the lathe revolved, be central and stationary.

The CHAIRMAN said that could only refer to a single lens.

Mr. ACKLAND, confirming this remark, added that where there were four lenses or more, the sources of error became multiplied; they might proceed from the lens being ground wrong, the brasswork made wrong, or the lens mounted wrong in the brass-work, all of which sources of error would be detected by the method to which he referred.

Mr. HUGHES repeated his protest against any recognition of the superior accuracy of a plan of which they knew nothing.

The CHAIRMAN said he did not pretend to give any palm. It was clearly manifest that the plan given by Mr. Shadbolt was a very rough one, and designed only as a test for a single lens. Mr. Ackland stated that his plan would decide satisfactorily whether there was perfect coincidence in the respective axes of the lenses in a combination, and he took Mr Ackland's word for the truth. In regard to the use of the lathe for this purpose it could only give an approximation, as a slight amount of deviation would not be apparent without the use of the microscope.

Mr. ACKLAND said he had not claimed any personal palm in the matter. But if any gentleman present had a portrait lens with him, he would ask the Chairman to step outside, and would convince him in a few moments that what he had stated was the fact. That would put the matter in a clear light.

Mr HUGHES would still protest against anything of the kind. The attention of such meetings should be devoted solely to matters capable of free discussion. They were all, he thought in a wrong position, their worthy Vice-president (Mr. Ackland) included. He was sorry that anything had been introduced in which they could not be perfectly frank with each other. (Much applause.) He begged to move the previous question.

The CHAIRMAN said the matter had better drop.

Mr. ACKLAND said, had the matter not been taken up in the way it had been by Mr. Shadbolt, it would have dropped. He was asked a question at the last meeting which he was not prepared to answer, and without wishing to give any offence, or enter into the subject, he gave the shortest answer he could, and stated that the method asked for was a trade secret. He did not boast of it, nor had he jested with the society, and he thought he was entitled in self-justification, in making the statement he had done to-night. The offer he had made to the Chairman of proving the truth of his assertion had been made in his own vindication, as it had been implied by Mr. Hughes that the matter rested on his *ipse dixit* only.

The SECRETARY said the possession and retention of a trade secret was not a very heinous crime. Most tradesmen had secrets which they thought they had a perfect right to use for their own benefit. But to make that a secret which was really no secret would be a very ridiculous thing. Their worthy Vice-president had been placed in the position of appearing to do this, and he thought he was quite right in justifying himself, and putting the matter in a proper light. That being done the subject ought to drop.

Mr. HANNAFORD said Mr. Ackland's complaint appeared to be that Mr. Shadbolt had charged him with keeping back from his brother members, as a trade secret, that which was really well known. Mr. Ackland had had, as he ought to have, an opportunity of denying such a charge, and that denial was sufficient.

After some further conversation on this question, the subject dropped.

Mr. HERVE' then read a paper on "Positive Collodion Pictures on Glass." (See page 338 in our last).

After a vote of thanks to Mr. Hervé had been passed,

Mr. MARTIN wished to ask Mr. Hervé a few questions; they were, Why, in reference to the bath, he laid such stress on the slow filtration? Why did he add collodion to it? and why, for neutralizing acid in it, he recommended ammonia. The addition of iodide of potassium he thought must be a simpler method of saturating the bath with iodide of silver than the addition of collodion, as it avoided the addition of ether and alcohol, with which the bath generally became charged much sooner than was desirable. One of the fixed alkalies, like carbonate of soda, was generally recognized as the best for neutralizing the bath. He also asked why Mr. Hervé filtered the developer slowly? He should have thought that this would endanger weakening the solution by peroxidizing the iron, without obtaining any advantage that he could see.

Mr. Hervé said he added collodion because he found that a bath so treated was sooner fit for use than when that was neglected. He recommended slow filtration of the bath, because it seemed to him to better rid the solution of all carbonaceous matter. In reference to slow filtration of the developer, the danger of peroxidization did not exist, as he covered the top of the filter with a plate of glass, so as to protect it from the atmosphere, and he found that this careful filtration was beneficial in getting clear intense blacks. In regard to the use of an alkali for neutralizing the bath, he did not use any himself, but he had recommended ammonia to those who needed to use it, as better than carbonate of soda, because of his objection to the presence of carbonaceous matter in the bath, which was very difficult to eliminate. Those who had used kaolin knew that twenty or thirty filtrations would sometimes scarcely remove it entirely.

Mr. Howard, referring to the objection expressed by Mr. Hervé to baths of gutta-percha, handed one round for the inspection of the members, which was coated inside with a thick shellac varnish, which quite obviated any objection he thought.

Mr. Hervé said that when the solution was old and highly charged with alcohol and ether, the shellac would be acted on. Gutta-percha was more elastic than shellac, and the latter would be likely to crack at times.

Mr. G. Wharton Simpson said he had had a gutta-percha bath, without any preparation, in use for upwards of four years. The solution had never been out of it except for the purpose of filtration, and he had never experienced the slightest evil with it that was in any degree traceable to the gutta-percha. That substance, if pure, was quite without action on nitrate of silver solution.

Mr. Sebastian Davis confirmed the experience of Mr. Simpson by a statement of his own.

Mr. Hervé had had a French-made bath of gutta-percha, which turned the solution quite pink.

A conversation, in which Messrs. Hughes, Davis, Hervé, and others joined, then took place, on the use of vulcanized india-rubber for the tops of water-tight baths, in which it was decided that this substance should always be coated with common india-rubber or gutta-percha when used for that purpose.

Mr. Sebastian Davis then read a short paper on a new dry process. (See p. 351.)

Mr. Wall moved that in lieu of any present discussion on the subject, the paper be placed in the hands of the Experimental Committee.

Mr. Hervé seconded the resolution, which was passed.

Mr. Samuel Fry (late of Brighton) then read a paper on "Instantaneous Photography and Composition Printing." (See p. 350.)

After a vote of thanks had been passed,

The Chairman remarked that the subject of instantaneous photography was necessarily one of the first importance, not simply for landscapes, but for portraiture. The more rapidly a portrait could be taken, the more likely it was to be a perfect likeness by conveying the natural expression. The importance of introducing atmospheric effects into landscapes he thought could not be overrated. He knew that there were some who objected to the principle of printing from several negatives, but he thought if valuable effects could be secured by that means, which were otherwise unattainable, it was a perfectly legitimate process, as the specimens before them would prove.

Mr. Cotton said that in working in the open air instantaneous photography might be possible, but he doubted if it could with advantage be introduced into the glass-room. He thought, moreover, that the pictures obtained by instantaneous exposure were rarely so good as those produced by about thirty seconds exposure.

Mr. Hervé said that instantaneous portraiture was almost next to impossible in London. For infants he seldom gave more than about three seconds, and obtained successful results. If an instantaneous process could be discovered to suit London light, it would be a great boon.

The Secretary expressed his gratification with the paper they had just heard read, and he thought that when they saw men like Mr. Fry, who by long and careful experiment had arrived at such successful results, coming forward and freely placing their experience at the service of photographers at large, it was calculated to increase their faith in mankind generally. He was also gratified to hear Mr. Fry's testimony, as to the importance of introducing more artistic feeling into landscape photography, borne out as it was by the specimens before them. Nothing could be more offensive and unnatural than white skies, or rather no skies, but a mass of white paper in the place where skies ought to be. He invited members present to illustrate this for themselves, by taking up one of the pictures before them, and covering up the sky and clouds by a piece of white paper. All the beauty of the picture would then disappear at once, and from being full of beauty they became offensive. He thought there was amongst portraitists a not uncommon mistake as to the question of short exposures. They knew that many of the best pictures they obtained had been produced by long exposure, and thus they attributed the beauties of the pictures to the long exposure, whereas it was really due to the peculiarity of the light. The light which had rendered necessary the long exposure was a soft diffused light, which brought out with due transparency and depth shadows, giving them detail and transparency, and at the same time did not overdo the lights. If the model were equally well lighted, he saw no reason to doubt that even an instantaneous exposure would give equally good results. He believed that long exposures were fatal to excellence in portraiture, by inducing a stolid, vacant expression, without the slightest indication of mind. Pictures of this kind might be faithful maps of the face, but they were certainly not portraits.

Mr. Howard said that as the hour was getting late, and the subject was an interesting one, he begged to move that the discussion be adjourned to the next meeting,

Mr. G. Wharton Simpson begged to second the motion, which was carried unanimously.

Mr. Sebastian Davis then exhibited an ingenious developing box, for use in the field. The camera was attached to the front of the box, and the plate on being taken from the bath was at once placed *in situ*, without the use of a dark slide.

After the usual votes of thanks the proceedings terminated.

The following papers were announced for the next meeting:—"On Photographic Portraiture, with a Glance at its Comic Aspects," by Alfred H. Wall, Hon. Sec. "Report of the Experimental Committee," by Mr. Hannaford, Hon. Sec., E. C.

Dictionary of Photography.*

Printing—*continued.*—The prints, on removing from the fixing bath of hypo-sulphite of soda, should be placed in a dish of clean water and kept actively in motion, changing the water every two or three minutes for the first quarter of an hour. The rapid change of water, especially at first, is of much more importance than prolonged soaking. Various methods of washing have been recommended, all of which have been based on a recognition of the importance of constant changes of washing water. The practice of allowing a continuous stream of water from a tap flow into the dish, and slightly change the water by running over, has been in some cases adopted; but this is manifestly an inefficient and comparatively useless method, inasmuch as the solution of hypo-sulphite of soda, formed by soaking the prints, having a greater specific gravity than the water will naturally sink, and form, as it were, the lowest stratum, in which the prints will be immersed. It is imperative, therefore, in order to gain the advantage of the running water that the vessel empty itself from the bottom. This is sometimes effected by means of a syphon, so placed as to keep drawing off the lowest stratum of water. It may equally easily be managed by having an aperture in the bottom of the vessel of just equal capacity to that from which the water flowers. If the pipe conducting the water into the vessel be placed so that the stream shall fall at an angle instead of vertically, a rotatory or whirling motion is communicated to the water, and the prints in the vessel, which prevents the prints from sticking together. About twelve hours soaking in a continued change of water will generally be found long enough for perfect washing.

A plan for a complete and speedy washing, which at once commends itself to the photographer who can command time to attend to it, will be found very effectual. It consists in the frequent and complete draining of each print. It will be seen that if each sheet be pinned up by a corner, and suffered to drain thoroughly between each change of water, each subsequent washing will be much more complete, searching, and thorough, and thus effect the purpose in a satisfactory manner in a much shorter time than usual.

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* Continued from p. 285

Another method also demanding the individual treatment of each print, and consequently demanding much time, has been recommended. It consists in the use of a sponge to dab the surface of the print, whilst it is at the same time kept under a continued flow of water.

Many photographers prefer to finish the washing of their prints with boiling water, as affording the completest securing from the slightest chance of any portion of hyposulphite of soda remaining in the water. This is undoubtedly an excellent plan; but one in which not unfrequently the tone of the picture suffers a little. The hot water should never be applied until after thorough washing in cold water has been effected.

Whatever process of washing be adopted the judgment of the photographer should be exercised to secure the desired result, namely, the entire removal of the hypo from the texture of the paper. Long soaking is an absolute evil unless it be accompanied by constant changes of water. Without this each print really undergoes a long immersion in a dilute hypo-bath, the effect of which cannot fail to be detrimental. This fact should be especially borne in mind in the earlier washings.

Various processes have been suggested for testing the final washing waters for the presence of hypo-sulphite of soda; it being somewhat fairly assumed, that if the final washing water in which a print has been soaked for some hours, fail to give, on application of the most delicate re-agents, the slightest appearance of hypo, the print might be said to be quite safe. Good authorities express considerable doubt, however, as to the practical value of these tests, it being stated by some that a print may be purposely imbued with a small portion of hypo-sulphite of soda, and yet the water in which it has been soaked give no reliable evidence of the fact on being subjected to the proposed tests. One of the simplest of these, and one always immediately at hand for the photographer is nitrate of silver, a solution of which dropped into water containing a very minute trace of hyposulphite of soda, turns yellow, and finally brown and turbid from the decomposition of the latter and the liberation of sulphur. Proto-nitrate of mercury is regarded by some chemists as a still more delicate test; it is applied and acts in the same way. The exercise of thorough care and judgment in the process of washing may generally be relied upon for safe results.

(*To be continued.*)

PHOTOGRAPHY AT SOUTH KENSINGTON MUSEUM.*

JOHN SCOTT, ESQ.; examination continued.

"939. *Chairman.*] What do you mean by 'in the shade'?—In photographing such productions as the cartoons, it is desirable that they should be exposed to the sun, so that everything should be fully presented to the camera. The Board of Works were rather afraid, owing to the representations, I suppose, of Mr. Redgrave, of putting the cartoons in the heat of the sun; they thought the rays of the sun on the cartoons might give a tendency to chip, and I believe that Mr. Redgrave, who, of course, is the proper person to give an opinion upon that subject, thought that by very great care being given to the pictures there would be no risk in exposing them to the sun, and we had ultimately permission to work in the sun or in the shade.

"940. Were they to be taken down and put in a shady place in the open air?—Yes, out of doors.

"941. Do I understand you to say that Caldesi delayed photographing the cartoons till they were put in the sun, in order that he might have the advantage of photographing them in the sun?—Caldesi was desirous that Mr. Thurston Thompson should make the first experiment, because he thought that if Mr. Thompson found any difficulty, anything coming from him would be more attended to, and therefore he waived his right. It was found better to do them in the sun than in the shade.

"942. Mr. *Stirling.*] With regard to the prices of your cartoons, as published by you, have they always been the same?—Yes, always.

"943. Did you say that the Department at one time sold the photographs for a higher price than they now do, or that they were sold by Mr. Thurston Thompson on his own account?—What private arrangement was existing between Mr. Thurston Thompson and the Department, I know nothing of; but I know that Mr. Thurston Thompson exhibited his cartoons at the London Photographic Exhibition; they were exhibited as done by him and sold at the prices I have mentioned, 7s., and £2 2s.; that being the price, I suppose, which he calculated would afford a profit.

"944. Was that exactly the same as your price?—Our large cartoons, which are two inches smaller one way than his are, published at 14 guineas the set. In order to check the sale of separate copies we charged for a separate one, 2½ guineas; we prepared to sell them in sets; Mr. Thurston Thompson, I suppose, not having all his printed, because I think he only exhibited one at the exhibition, published his at two guineas.

"945. Have you not reduced the price of your cartoons in consequence of the opposition of the Department?—No.

"946. Has the sale of your cartoons diminished or ceased since the Department published theirs at a low rate?—It diminished from the time the announcement was made, and now it has almost ceased; but from the prestige of our house people come in ignorance and buy them; but of course if they can buy them at so much a yard they will not pay us our price.

"947. Mr. *Hankey.*] If no arrangement whatever had been made with you respecting the photographing of those cartoons, would you still have had the same objection in your mind to the Government allowing them to be photographed and sold?—I, as a commercial man should have a great objection to their bringing out a work which defied competition.

"948. Would it be in competition with you if they confined themselves to works which the public would have no right, as the public, to photograph?—I do not see that the public would have no right.

"949. I wish to confine my question to this: whether your objection is on account of the previous arrangement which you made with the Government regarding those photographs, or whether your objection is on the general principle that the Government should not, under any circumstances, themselves produce photographs in order to circulate them, and make the public better acquainted with works of art?—My objection is to the Government interfering with private enterprise. My objection is, that the Government are unwise in competing with private individuals; they make a monopoly, which is destructive of art instead of advancing it.

"950. You have already stated that without special permission on the part of the Government no private individual, as one of the public, could have a right to take a photograph of any public picture?—I should say not; but then comes the question, whether the public should not have the right.

"951. Mr. *Adderley.*] Do you think that the public should have a right to take down the cartoons whenever they please?—No; because there must be a proper person to judge of the state of the cartoons.

"952. Would it be safe to allow anybody to take a photograph of one of the cartoons, for instance, except under the guarantee of the public department in whose charge they were?—Certainly not.

"953. Mr. *Beamish.*] You say that you do not consider that the Department at Kensington should produce any works whatever for the public which might possibly be brought into competition with trade of any kind?—Yes; the prices at which they sell now are not only a dead loss to the public, but an attempt to mislead the public. Every photographer in the world would say, 'These things could not be produced at the money they sell them at.'

"954. You would not deny to the public the benefit of an institution of that kind, reproducing works of art and selling them, would you?—Yes; because it could be done as cheaply by private enterprise, and a great deal better.

"955. Supposing that through the instrumentality of the South Kensington Museum works could be produced for the benefit of the public which were not sold at a price which would altogether destroy private enterprise, would you object to that course?—Yes.

"956. You object altogether to their reproducing any works and selling them?—I object to the Department being turned into a trading establishment, because if the Government wants things to be done cheaply they should ask for tenders, and then Mr. Roger Fenton would not have to say, 'Since the establishment of the Department I have given up the higher branches of my calling.' Is it an honourable criticism on the Department of Science and Art that they step in and take away a large portion of the commerce which they are bound and which they profess to protect? It is unanswerable; let the Government take tenders, and then the best man would get it, whether Mr. Thurston Thompson or any one else.

"957. Mr. *Joseph Locke.*] You have no objection to their taking those photographs for the purpose of depositing them in their museum?—Not the least. Considering the great use which the Department at South Kensington Museum has been, and considering what the public owe to Mr. Cole, there could not be any objection to the reproduction of works for the use of the school.

"958. What you object to is, that when they have produced them they should sell them?—Yes; they state that they are going to do things which are not open to private enterprise, and then they put themselves into the position of traders.

"959. Previously to the establishment of the Department of Science and Art, do I understand you rightly to say that pictures or other works of art were copied by different houses in the places where they were deposited?—I have reason to believe that all applications from photographers or other artists for reasonable access to public works, for the purpose of reproducing them by copies in water colours, or oil, or photography, were always acceded to by the department which had the custody of those things, unless there were some strong reasons to the contrary. The Trustees of the British Museum, with a great deal of kindness, allowed valuable prints to be copied by anybody; but at last they found that injury arose to the prints, and they then very properly put some restriction upon it, so that every blockhead with half-an-hour to spare should not go there to spend his idle time, and damage the public property.

"960. You stated that Mr. Thurston Thompson has sold those photographs?—I can only draw my inferences; there is the bill which I have handed in, and there is his receipt; and I see by the catalogue of the Photographic Exhibition of London, that Mr. Thurston Thompson, as Mr. Thurston Thompson, sold those very cartoons.

"961. *Chairman.*] Have you any other instances of that kind?—No, I have not.

"962. Sir *John Shelley.*] Were those sold on Mr. Thurston Thompson's own account?—I presume they were; Mr. Cole could explain all that; what the mode of working was that enabled Mr. Thurston Thompson to sell for himself.

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* Continued from p. 346.

"963. I see here 'discount 25 per cent.'; was that a discount allowed to you because you were in the trade?—Yes.

"964. That was a discount allowed as between one tradesman and another?—Yes; he certainly gave me to understand that we were to have been the publishers of his cartoons, which I, as one of the public, had paid for; and that, in consequence of our conduct in robbing him of his idea, he should seek another publisher.

"965. He ceased to employ you?—Yes; and gave us the benefit of that aid and assistance which Mr. Cole referred to; what that aid and assistance was, the Committee will be able to judge. I understood Mr. Cole to say that everything worked quite comfortably. I should think that Mr. Cole must be disabused of that idea now.

"966. The sum of your evidence amounts to this: you object to competition with private trade being carried on by a department which has the public money to work with?—I would not like to use the word 'competition'; it is not competition, because it is downright murder.

"967. You object to your being undersold by the Government?—Yes, decidedly. The use of public money to crush private enterprise.

"968. Did I understand you to say that, with regard to Buckingham Palace, Windsor Castle, and the National Gallery, any of the first-class respectable photographers get permission, and are actually allowed to photograph the pictures?—Her Majesty's gracious condescension in placing the Royal and Crown property before the public is shown in the numerous works, photographic and otherwise, which we and other professional people have been permitted to produce; of the National Gallery I speak with more caution, because I might be liable to correction; my belief is, that permission would be given to any respectable photographer, under proper restrictions.

"969. Mr. Cole is asked this question at No. 352; will you say whether what he states is correct or not: 'With reference to copying things at home, why cannot we leave that to private trade?' He answers, 'At the British Museum the Trustees could not permit the public to take out objects whenever they pleased to photograph them; it must be done by some one person in whom the Trustees have confidence.' Do you say that, supposing a person in the position of Messrs. Colnaghi, whom it may be presumed the Trustees would have confidence in, were to apply, can you state that the Trustees would give permission for such parties to take photographs?—I have read to the Committee the letter in which the Trustees gave permission to photograph the Elgin marbles; I stated to the Committee that to Mr. Prout also like access to the British Museum was granted; also to Mr. Lovell Reed, and I believe, hosts of other people.

"970. 'Passing on to another case,' he says, 'the University of Oxford did not hesitate at all to entrust its Raffaelle drawings to the department; I doubt very much whether they would have entrusted them to any other body but a Government department to photograph them. The same thing applies to Windsor Castle; the Queen has been so gracious as to allow us to photograph anything at Windsor Castle, which the schools liked to make use of, and to allow the public to purchase them.' Then he is asked later, in the next question, 353: 'You say that private trade cannot do these things, why not?' He says, 'Because nobody would give it permission'?—There was never a greater mis-statement. The respectability of our house is a guarantee which would enable us to get permission from any one. The pictures, drawings, &c., in the Manchester Exhibition were put at our disposal to photograph; and the efforts which the Department are now making entirely originated in the sucess of that work, which exhibiting our skill (as is shown by the acknowledgment of the Committee to Mr. Colnaghi in the official catalogue of the Art Treasures Exhibition) carried out, and that is a complete answer to Mr. Cole's assertion. Her Majesty the Queen, His Royal Highness the Prince Consort, Lord Northcote, the Earl Cowper, Mr. Holford, M.P., the Earl of Carlisle, the Duke of Newcastle, the Duke of Portland, Viscount Dillon, Lord Overstone Miss Burdett Coutts, Mr. Walter, M.P., Mr Labouchere, the Earl Spencer, Mr. Miller of Preston, Mr. Dillon, Mr. Ashton, Mr. T. Fairbairn, the Marquis of Westminster, the Earl of Ellesmere, and many other of the most celebrated amateurs in the country, besides the Bodleian, the Royal Society, and other institutions, put their contributions in our hands. We have works of art, to the value of 30.000*l.*, at this moment in our house, belonging to Her Majesty, His Royal Highness the Prince Consort, the Duke of Portland, &c., &c. Lord Spencer, Lord Ellesmere, having given us permission to photograph their galleries, the nobility and gentry who own valuable miniatures are lending them to us for the purposes of the historical portrait work to which I have already referred; the Duc d'Aumale and others, the first people in the country. There is nothing in this country which private enterprise cannot have access to

"971. In the next question, 354, he is asked: 'Are there any regulations in the Department which restrict its operation to things which would not be open to private trade?' The answer is, 'We scrupulously avoid photographing anything which the public can photograph for itself'?—The cartoons, for instance.

"972. Do you agree that that is so, or not?—Take the cartoons.

"973. *Chairman.*] Can the public photograph the cartoons for themselves?—Yes, by the permission of the authorities.

"974. Sir *John Shelley.*] By the word 'public,' do you mean persons in a high position as photographers, such as Messrs. Colnaghi and Co.?—I mean anybody who, by the confidence reposed in his character, is worthy of being entrusted with valuable property.

"975. Do you believe that permission would be given to any person of high position and talent to photograph those various things?—In regard to the cartoons at Hampton Court, my impression is that the Government would would probably never allow them to be photographed again, because they have been photographed so well already. I do not think that Government, considering the dilapidated state in which they are, and it being their intention now to enclose them in glass, would like to remove them again.

"976. In allusion to the cartoons at Hampton Court Palace, the Honourable Member on my left asked this question of Mr. Cole: 'Were those cartoons taken for the South Kensington Museum?' The answer was, 'Yes.' Then at 377, 'Those are for sale at Colnaghi's, are they not?' And the answer is, 'We allowed Colnaghi's to have the facilities of the apparatus and stages that we put up; we applied to the Office of Works for permission to photograph the cartoons, and we gave an assurance that they should be watched,' and so on. 'We went to some expense for apparatus, and we did the whole business most carefully. We were asked if we had any objection to Colnaghi's, on their own responsibility, doing the same, and we had none at all.' Do you object to that answer, as in any way being otherwise than the fact?—I can only leave the Committee to judge whether what I have told them is true: and if so, to draw their inferences. I have made my statement; the Committee must judge how far Mr. Cole is right. It should be borne in mind that there are two people in this matter; there are Mr. Cole and Mr. Thurston Thompson. I must say that Mr. Thurston Thompson behaved ill to us, but I do not want to connect Mr. Cole with it.

(*To be continued.*)

Photographic Notes and Queries.

Various Queries.

St. John's Wood Road.

Sir.—I should feel obliged if you would be good enough to answer the following queries the correspondence column of the "Photographic News:"—

1. Am I (as an amateur) infringing anyone's patent by using a dark box of my own making, somewhat similar in form to that referred to by Mr. Hardwich in his "Photographic Chemistry?"

2. Before colouring a paper photograph (in water colours), is it necessary to varnish or overlay it with anything—if so, what is used for the purpose? Also, are ordinary soft water colours suitable for photographs? if not, in what particular do photographic colours differ from those in general use.

3. Some negatives were, after well washing with water, placed in the plate box to drain and dry, the lid being closed, on opening the box next day, very little trace of any of my views was discernible—they had all more or less dissolved away—what was the cause of this? I employed the ordinary one-grain pyro developer, the bath being made with the addition of acetate of soda as directed by the labels on the bottle of collodion which I used on the occasion. My fixer was hyposulphite of soda.

With every apology for troubling you with so many questions. A Tyro of Limited Means."

[As an amateur you may make any form of dark box [illegible] may see described, without violating any patent; but we doubt whether you will make one, unless you are skilled in the use of tools, as cheap or efficient as some which are made for sale.

Photographs generally require some preparation before applying water colours. We know of nothing so suitable for the purpose as "Newman's Preparation." Any good water colours will answer the purpose.

We presume you had used strong hypo for fixing your negatives, and had not sufficiently washed the plate afterwards, and thus secured the "dissolving views" which resulted. When hypo is used for fixing, a very thorough washing is necessary. —Ed.]

Miscellaneous.

Transferring Pictures to Glass.—A patent has been granted recently to Willoughby Smith, of Dalston, for the following process relating to transferring prints. He takes the print of any picture produced on paper and treats its surface with three coats of collodion. When this is set and hard, the paper is washed off, when the ink or colour will be found firmly attached to the film of collodion. To effect this operation perfectly. the print should be first stretched on a board, and receive the coats of collodion, then put into water to soften it, when it may be easily rubbed off, leaving the design firmly fixed upon a transparent coat of collodion, which is then allowed to dry and afterwards receives a thin coat of transparent varnish. Collodion may be rendered tough and transparent by adding about three per cent. of castor oil and the same amount of Canadian balsam to it, and boiling them together in a close vessel until they are thoroughly incorporated. The printed film of collodion is now ready for mounting upon glass. This is done by placing it between two plates, pressing them close together, and cementing their edges by pasting a strip of paper around them. By this process any printed pictures may be transferred, rendered transparent, and fitted for the slides of magic lanterns. These collodion transfer pictures may also be pasted on single strips of glass and covered on the back with transparent varnish, and in this manner ornamented windows may be easily made by almost any person.

Talk in the Studio.

The Cartoons.—A new work entitled "Expositions of the Cartoons of Raphael," is announced to be illustrated with photographs from the originals.

A New Rival to Gas-light.—The *American Journal of Gas Lighting* records that a Yankee down-east is inventing a new machine for bottling up sunlight, and says he has got it—almost. Before this invention, gas may well "pale its ineffectual fires." M. Niepce had better look to his laurels.

Explosion of Gun Cotton.—A photographer making pyroxyline a few evenings ago, imprudently placed it in an oven to dry, the fire having just gone out. He intended to remove it before retiring, but forgot. The servant next morning closed the oven door and made on the fire. The consequence was, of course, in a very short time a serious explosion, which happily, did not cause much damage, beyond dislodging the whole range and breaking some parts of it.

Photographic Society of Scotland.—The following are the regulations in connection with the forthcoming exhibition, which opens in February, 1861, and will continue open about two months. All descriptions of photographs will be admissible. It is strongly recommended that each picture should be framed and glazed, with a margin of mounting-board not exceeding 2½ inches in width. It is also recommended that, in the case of pictures smaller than 9×7 inches, four should be in one frame; but no frame must exceed 12 square feet in area. Each picture must have written distinctly on the back, the name of the subject,—the artist and owner,—the process, (calotype, waxed paper, the different varieties of the collodion process, &c.)—and if for sale, the price. Exhibitors are requested to be careful in specifying the particular process by which their pictures are taken, in order that it may be inserted in the catalogue. Two of the Society's *Silver Medals* will be given for the best two pictures in the exhibition: one of them will be awarded for the best portrait or group, and the other for the best photograph of any other subject. A commission of 10 per cent. will be charged on all sales made during the exhibition. Works intended for exhibition, must be delivered, carriage paid, at the rooms, No. 90, George Street, Edinburgh, on 15th January next, after which none can be received. A list of the photographs sent must be enclosed in the case, and a duplicate list forwarded to the honorary secretary. At the close of the exhibition the pictures will be carefully packed and returned, carriage paid, to the owners.

The Photographic Exhibition,—The eighth annual exhibition will open early in January, at the Gallery of Water Colours, in Pall Mall. In connection with this subject, we have heard serious complaint of the careless treatment of specimens, forwarded for last year's exhibition, which must operate as a fatal obstacle in many cases to the exhibition of valuable pictures; especially by amateurs, who have no pecuniary advantage to derive from the exposition of their productions. That a certain amount of wear and tear in frames &c. is a necessary contingency of their exposure for a few months, there can be no doubt; but that considerable damage and actual breakage should occur, and that to a serious amount, appears altogether inexcusable. This is not, however, the worst: in one case, we are informed, that specimens and stereoscopes, forwarded for exhibition, amounting to a money value of not less than five pounds, were actually lost; no account of them being forthcoming up to the present time. We feel assured that this neglect is not due to any intentional mismanagement either of the Council or their courteous secretary; it is important, however, that their subordinates, to whom such matters are entrusted, should be made responsible for the safe keeping of goods so entrusted to their care.

Caricature and Caricaturists.—A lecture on this subject, in which various phases of photography were used in illustration, was delivered on the evening of the 20th inst., by Mr. Alfred H. Wall, at the Walworth Literary institution, to a large and highly amused audience. Mr. G. Wharton Simpson occupied the chair.

⁂ Our Correspondents will aid us in our endeavours to solve their difficulties if they will in all cases state details of their operations when failures occur; and when referring to former articles in the News giving the exact reference. Letters intended for the Editor should be addressed expressly to him.

To Correspondents.

W.—The length of your copying camera will be regulated by the size you wish to copy, and the focus of your lens. If you use the lens of which you speak, of 6 inch focus, a camera extending 30 inches will allow you to copy up to four times as large as the original. We have not used the stereo lens to which you refer, but think it is probable it will answer your purpose. See a chapter on enlarging, with a valuable table, in the Photographic News Almanac, to be published to-morrow.

Marianne.—Your specimen arrived in a lamentable state of "smash;" but, by putting the pieces very carefully together, we were enabled to form some idea of its faults. We do not, personally, like the developer to which you refer. Use an older collodion, giving a more creamy film in the bath, expose a little shorter time, and develope a little longer, using 15 grains of iron, 15 drops of glacial acetic acid, one drop of nitric acid, and a little alcohol; or use the protonitrate developer, given in a former number. We do not generally like negatives produced from positives by means of bichloride of mercury; they are hard, and wanting in gradation. You will find all the information you require on the subject in an answer to "Excelsior," page 246 in number 108. Let us know how you succeed with positives.

John Oxford sends us a very complementary letter, accompanied by a specimen of a fine black tone, to show his success with alkaline gold toning, as recently described in these pages. We are glad to hear of his success, and obliged by his good opinion.

W. L.—Your pyrogallic acid solution will generally be less active when it is discoloured, but not necessarily useless. A trial will determine with most certainty.

D. W. W.—For lenses the first name you mention is one of the best makers. For cameras the second name, "How to colour a photograph" is, we believe, out of print. Order "Harmonious Colouring applied to Photographs," published by Newman. The difference between double achromatic lenses, and those you have named, is very great, in rapidity, sharpness, and and accurate definition. If you send us your address we can give you fuller information by letter.

G. P.—We fully agree with the truth of your first proverb; and altogether dissent from the application of the last to your case. We shall, at all times, be glad to assist you. Mr. Rejlander's paper on "Composition Printing" was read to the Photographic Society before Photographic News was in existence: it is published in the Journal of the Photographic Society, for April, 1858. You will find some hints on the subject in Mr. Fry's paper in this number.

R. T.—The use of a good bromidized collodion, iron development, a bath in good order, and a good light, are all that you need. Read an article on "Instantaneous Photography" in the Photographic News Almanac, which will be published to-morrow. Also another article on the same subject in this number.

J. H.—Tone considerably deeper. Let the colour be very much darker than you require it before taking it from the gold bath; or, use a sample of paper which is more highly salted. The fault you complain of is not uncommon, and is often due to insufficient salt in the preparation of the paper.

H. Woodward.—In the article to which you refer, and which appears in No. 103, it is not stated that a license is necessary to practise the collodion process in the United States; but that, there, bromides cannot be used in collodion without a license: a restriction quite as absurd.

J. B. Y.—Yo do not need a lens for the purpose; but a concave reflector. Even that is unnecessary, as you may get over your difficulty in two or three ways, simply enough. Do not bring your negative so close to the gas-light; but hold it at a sufficient distance for the light to have become somewhat diffused, and keep the negative in motion. A ground glass-shade on the gas-light would diffuse the light; but would, of course, increase the exposure; which, for printing transparencies, is not, however, of much moment. We have not space here to describe how the light passes through lenses. You will find information on the subject in previous columns.

A. Drummond.—It is somewhat difficult to get good photographs of oil paintings, and requires some experience. Place the painting in such a position that it will not reflect light into the camera, and proceed in the ordinary manner, using a collodion, which gives a good deal of contrast and intensity. A very old and dirty painting may be sponged with water first, and taken whilst wet; the details are brought out better so. The speckled appearance, of which you speak, is due to the texture of the picture, and cannot be entirely got rid of.

W. S.—A French patent is no prohibition to the manufacture of the article in this country. Unless it has been patented in this country there is nothing to prevent your friend from manufacturing it.

W. Jones.—A half-inch stop admits just one-fourth of the amount of light admitted by an inch stop, and would require four times as long exposure.

Richard F.—You should, if possible, see the apparatus before attempting to make anything. We cannot fully describe it here; and it would require diagrams. The gases may be mixed in one bag; but in such case a pipe, of from one to two feet long, should be used, filled with fine wires, so as to constitute a kind of filter for the gas to pass through before ignition. A single wire gauze would be scarcely sufficient. The object is to prevent the possibility of the flame passing down the pipe, and coming in contact with mixed gases in the bag, which would cause an instant explosion.

Test Paper.—We have not met with it: not an English plant we think. We will make further enquiry.

Very Troublesome.—Unless you know something of lithography and lithographic printing you will scarcely succeed in your experiment. It is utterly impossible, in the space we have at command in this column, to give you the requisite instruction. Lithography is based on the mutual repulsion of water and grease. A stone, of suitable absorbent texture, is used; and an image formed on it of a greasy substance. To make this print, the stone is sponged with water, which only remains on the clear parts of the stone, being repelled by the greasy image; a roller, charged with a greasy ink, is next passed over it: this ink adheres to the image, and is repelled by the wet stone. A sheet of paper is now placed on the stone, and pressure applied, and the image is printed on the paper. The method may be varied; but the principle is the same. Proper stones, presses, rollers, ink, &c., are manufactured for sale. We shall possibly have some articles on photolithography shortly.

THE PHOTOGRAPHIC NEWS.

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ALKALINE GOLD TONING PROCESSES AND THEIR REQUIREMENTS.

The method of toning silver prints by means of a solution of alkaline chloride of gold has now been before the public for two years, and has, we think, fully justified the hopes which have been entertained from its first introduction regarding its value as a toning agent for permanent prints. The "old hypo" bath is gradually becoming discarded, except in some commercial establishments where economy is considered more important than the production of permanent photographs.

It must not be overlooked, however, that notwithstanding the success which has attended its use in the main, failures and disappointments in its application have occurred in many instances. A curious illustration has been afforded of a law which seems to pervade the world of physics as well as of ethics; namely, that in proportion to the perfectness of a part must be the perfectness of the whole, in order to obtain harmonious results. That in order to secure the success of a perfect theory, we must have perfect application of that theory. In using the alkaline gold toning baths we must, if we would attain a satisfactory print, have everything in its best condition, and the manipulations must be conducted with the utmost care throughout.

The negative should be perfect, brilliant, and vigorous, with a few points of perfect opacity for the highest lights, delicately graduating to a few points of perfect transparency for the deepest shadows. Mr. O. G. Rejlander recently remarked, in a conversation we had with him on this subject, that for producing a perfect print from a perfect negative, rendering with the utmost truth and faithfulness every beauty in the negative, he knew of no process which could equal the process of printing, toning, and fixing recommended by Mr. Maxwell Lyte.

The paper should be good, and selected with a special view to the kind of result desired. If delicate gradations of black or grey tones are desired, then Saxe paper will generally be found to answer. If bold contrasts and reddish tones are desired, a thicker paper more highly albumenized should be used: some of the English papers, and the *papier Rive* will be found to meet the latter requirement.

The preparation of the paper by salting and albumenizing should be conducted with an especial view to the use of the alkaline gold toning bath. A maximum proportion of salt should be added to the albumen—Maxwell Lyte recommends as much as four per cent., which is about nineteen grains to the ounce. About fifteen grains to the ounce we have found to give good results. In many establishments where paper is albumenized in a wholesale manner, about ten or twelve grains are used, and in some we have heard that it is added by guess. It will be a fortunate thing for photographers when albumenizers of paper can be induced to state the strength of the salting solutions used in the preparation of various samples of paper, so that they may know exactly with what they are working. The albumenizing should be so conducted as to keep it well on the surface of the paper, instead of sinking into its texture. Short floating and rapid drying materially tend to this result.

The silver solution should be made strong enough, and the strength well kept up. Sixty grains of nitrate of silver are generally regarded as a normal strength; if, however, nineteen grains of salt be used, as recommended by Mr. Lyte, the silver solution should be much stronger, say about one hundred grains to the ounce of water. If fifteen grains of salt be used, a silver bath of about seventy or seventy-five grains to the ounce will be desirable. A bath of sixty grains will be sufficiently strong for most commercial samples of albumenized paper, as they do not generally contain a larger proportion of salt than twelve grains to the ounce. In all cases, a strong bath, short floating and quick drying, gives the most brilliant prints. *It is of the utmost importance that the silver bath should be from time to time tested, and the strength of it kept up.*

The printing should be effected as soon after exciting the paper as possible. Considerable over-printing is generally desirable; the lights should be of a delicate lavender tint, and the shadows deeply bronzed before the print leaves the pressure frame.

The prints should be washed in two or three changes of water just before toning, and the final washing water may have a little salt added. Long soaking in salt and water renders the toning more difficult. All the processes in connection with printing and toning, with the exception of exposure, should be conducted in the dark or in yellow light, and the most scrupulous cleanliness as to the fingers and dishes be observed. In regord to the latter, it is desirable that each one be kept to its own purpose and never used for any other; and the utmost care should be taken not to put the fingers into the gold solution which have just touched the hyposulphite of soda.

Several different forms of the alkaline gold toning bath have been proposed, all of which have been practised with more or less of success. We shall only refer to those with the results of which we are familiar, and can speak with personal confidence. The first is the process of Mr. Maxwell Lyte, with which most photographers are already familiar. It stands thus:—

Chloride of gold	1 grain.
Phosphate of soda	18 grains.
Distilled water, *quantum suff.*	

The chloride of gold and phosphate of soda should each be kept in solutions of given strength, say one grain of gold to an ounce of water, and eighteen grains of phosphate of soda to an ounce of water; they can be then well mixed in any quantity required for use, and diluted with sufficient water to float the prints in easily. The only effect of using a large quantity of water is to make the process of toning somewhat slower, which is frequently an advantage. Sufficient water tends moreover to secure regular toning. The prints should be kept moving, and prevented from sticking together, or red, imperfectly-toned patches will be the result. The water used for diluting the bath may be previously made warm, as it materially facilitates the process, especially in cold weather.

The process of toning is more rapid in some cases than others, but in most cases a few minutes—from about two minutes to ten—is sufficient. It is in all cases desirable to allow the print to assume a little deeper tint than is desired in the finished picture, as a little will be lost in the hypo fixing bath. If a sepia or purple brown be required, a decided purple tint should be obtained in the toning bath. If a decided purple be desired, then the tint in the toning bath should be black,

For the phosphate of soda, the bicarbonate of soda, or biborate of soda, may be substituted, but in less proportions—in regard to the carbonate, especially, as an excess of it has a tendency to dissolve the size of the print, and in some cases even the albumen. Five grains will, therefore, be generally found sufficient, the only object being to neutralize the free acid in the chloride of gold.

We have seen very fine prints produced by the toning process recommended by Legray, which is as follows:—

Chloride of gold	1 grain
Chloride of lime	1 "
Chloride of sodium	1 "
Distilled water	4 ounces.

The treatment is similar to the first mentioned, but as it has a strong bleaching tendency, it is necessary that the prints be considerably over-printed.

The last process of gold toning to which we shall refer is one published during the past year as being the suggestion of M. l'Abbé Laborde. We may mention, however, that its advantage had been pointed out some months before by Mr. Hannaford, who states that a peculiarly rich purple bloom is secured, which is absent when any other salt of soda is used with the gold, with the exception of the citrate as proposed by Mr. Hardwich. which has a similar effect. Mr. Hannaford states that it has another advantage, which the Abbé confirms; namely, that it may be used more than once; all other alkaline gold toning baths being useless for toning purposes after once being used for toning. The formula stands as follows:—

Chloride of gold	15 grains
Acetate of soda	7½ drachms
Water	35 ounces.

The solution becomes colourless by degrees, and at the expiration of twenty-four hours it is ready for use. On removing the positive from the printing frame it is washed in two or three waters, to remove the free nitrate of silver; it is then immersed in the gold bath, where it must be allowed to remain not more than twenty-five to thirty seconds, when the bath is first used.

If the gold bath has been used before, its action is slower. Experience will enable the operator to see by the successive changes in tone the proof assumes when he should remove it from the bath. If it be removed too soon, the proof assumes a disagreeable red hue after it is fixed with the hypo; on the other hand, if it be allowed to remain too long in the gold bath, the proof assumes a cold blue tint. Between these two extremes there are a variety of tones of sepia and of violet, which can be secured by removing the proof at the proper moment. In proportion to the length of time the gold bath has been used, so we must prolong the toning, until the required tint appears. The strength of the gold bath can be restored by adding fresh chloride of gold; but before making the addition, we must take care that the solution is nearly colourless, for if the chloride of gold is not in combination, it will, like other chlorides, weaken the proof.

In all cases the prints should be washed in two or three changes of water, and then immersed in the hyposulphate of soda, which it is desirable should possess a strength of at least twenty per cent., or four ounces to a pint of water. It is better used fresh each time, and should be neutral or slightly alkaline. Mr. Lyte recommends the addition of a little Spanish white, or chalk, for the purpose. Prints on thin paper are more rapidly fixed than those on thick; but they should not in any case be removed from the fixing bath in a shorter time than ten minutes. They should then be washed in several plentiful changes of water within the first half-hour; and subsequently soaked and washed so as to thoroughly remove all traces of hyposulphite of soda.—*Photographic News Almanac.*

SCIENTIFIC GOSSIP.

In a recent number we gave an account of some experiments on photographing the earth from a balloon. Our notice of this having attracted considerable attention in scientific circles, we think some further remarks on the same subject will prove interesting to our readers. The advantages of balloon investigations have long been known to scientific men, and the ascents made by the Kew Committee have permanently enriched our knowledge of meteorology, and yet it is to be wondered that these instruments of investigation have not been more resorted to for the solution of many problems. A recent instance may be cited in which a scientific expedition went to the Peninsula, and under Government auspices incurred heavy expenses of time and money to witness an eclipse of the sun. We all know how near some of the astronomers were losing all sight of the phenomena, owing to the presence of clouds, which would have produced a failure of the expedition as total as the eclipse itself. Probably few heavy clouds are above two or three thousand feet above the earth, so that with a balloon in readiness one or more observers could place themselves in a few moments far above all impediments. In a balloon, also, and in the absence of clouds, the approaching shadow of the moon could be seen coming for many miles; and it is not impossible that the roughened edge of the moon could be seen distinctly mapped on the ground by its shadow. We mentioned formerly that the experiments had met with decided success. The two pictures which have been kindly shown to us as having been taken on this occasion, furnish abundant evidence that photography can be applied under favourable circumstances to the production of bird's-eye views of towns and cities, for mapping out with accuracy the coast and harbours at the sea-shore, and for delineating roads, lakes, and watercourses of the interior of a country. One picture is a view of Providence, looking westward, and encloses a portion of Federal Hill, with Atwell's Avenue in the foreground, and the Atlantic Delaine Mill in the distance. All the buildings included are sharply defined and well marked, though wanting in brilliancy owing to the absence of sunshine. One of the peculiar misfortunes to which photographers are heirs to happened to this plate, the collodion film cracking when drying spoiled it as a picture; the print from it looking as if an earthquake were plunging the whole region roundabout into chaos. Sufficient, however, is preserved to show what the picture would have been if this accident had not happened. The second is a view of Providence, southward,, and along the western shore of the bay. It embraces a portion of the western part of the city, and South Providence, Field's Point, and the whole shore to Conimicut Point in the distance, and shows distinct indication of Prudence Island, twelve or fifteen miles away. This picture does not look so sharp as the preceding one, owing to the photographer (Mr. Black, of Boston), having endeavoured to bring out more of the details by giving longer exposure—during which time the balloon moved.

It must be borne in mind that these pictures were taken from a low elevation of twelve hundred feet; from an elevation of twelve *thousand* feet a much wider extent of country could be brought into the field of the camera. The eye of the aeronaut, and consequently his camera under similar circumstances, sees the bottoms of rivers and harbours, and can readily trace out the channels and shoals. From a high elevation the eye seems to be beyond the influence of the reflected light of the sky, and it is doubtless on this principle that sword fishermen can see their game from the mast-head, and so be able to direct the course of the vessel correctly long before the fish is seen from the deck. It is said, too that men at the mast-head can see to the bottom of shoal spots in the ocean, and discover objects upon them. Fish-hawks, and some other aquatic birds, rise far above the water, and see their prey, and then dive down instantly upon it. The camera under similar circumstances acting like a great eye, capable of seeing and of perpetuating the view by chemical means upon its retina, might thus be applied from the stand-point of a balloon, to make pictures of harbours, and to show its shoals and channels, and used as a valuable adjunct for the aid of navigators and coast surveyors. It was a sagacious thought conveyed in the answer of Dr. Franklin, when he was asked, "Of what use are balloons?" He replied, "Of what use is a new-born babe? It is of no use as a child, but if we nourish and cherish it, it will one day grow to be a man, and be strong and useful." The art of ballooning is thus in its infancy; it has indeed proved to be a child of slow growth, but we feel none the less sure that the student of science will yet resort to the aeronautic art to study many of the phenomena of nature yet unknown, and to obtain a further insight into those which have already been applied to useful purposes.

Another method of cleaning platinum vessels has been recently described. It consists in gently rubbing upon the dirty metal a small lump of sodium amalgam. Sodium has the curious property of lending to mercury the power of "wetting" platinum in a most complete manner, the "wetted" metal not undergoing, however, the least trace of amalgamation. When the amalgam has been rubbed on with a cloth, until the whole surface is brilliantly metallic, water is applied which oxidises the sodium. On wiping off the mercury, which can then be done with facility, the platinum surface is left in an admirable condition for the burnisher.

A patent of some interest to photographers has recently been taken out by Mr. Eidlitz. It is for improvements in producing printing and other irregular surfaces by the aid of photography. The subject of this invention is an improved method of preparing by the aid of photography, the moulds upon which a metallic deposit is to be made by the electro-metallurgical process, and the invention consists in the use or employment of a chemical agent, having the property of being rendered insoluble in water by exposure to the action of light, and in combination therewith a substance which is more or less expansive under the influence of moisture. The chemical salt which the inventor prefers to employ is the bichromate of potassa, and he has discovered (!) that when gelatine is impregnated with the said salt, and submitted to the action of light in an ordinary photographic printing-frame, it becomes differently affected by the different degrees of light which fall upon its surface, consequent upon the lights and shades of the negative employed, and that this difference can be relied on to occur with such accuracy that when the gelatine is afterwards exposed to the action of moisture, elevations and depressions, corresponding exactly in degree with the lights, shadows, and middle tints of the photographic negative, will be developed on it. The above is a condensed abstract of this remarkable patent. It has been our lot on more than one occasion to witness the facility with which photographic inventors and patentees become oblivious to the prior claims of the real discoverer of any particular re-action; but for cool and wholesale appropriation of the fruits of other men's brains, and in claiming them as original discoveries, we venture to say this patent stands unrivalled.

DIALOGUE SKETCHES.—No. 1. Photography to Art.

(From a "Photographer's Common-place Book."*)

> "Into the heaven of heavens Art soareth free;
> Again descending from her native skies
> She takes the common world that round us lies,
> And moulds it to the eternal harmony."—J. C.

Looking over the pages of my Common-place Book, I find recorded, as illustrating the relation of photography to art, the substance of some conversations on this subject which took place in the studio of a brother-brush. As they convey some truths I am anxious to impress on the minds of my photographic readers, I venture to transcribe them here. I must ask you to imagine as the scene an artist's painting-room, with plaster studies, folios of prints, drawings, and photographs, drapery, pieces of armour, anatomical models, &c., scattered about. Copies of the best old and modern masters, photographed and painted, upon the walls; some lay figures in a corner, and a glass-room with camera, &c., seen through a door.

Lovetruth, an artist, discovered painting at an easel from a large photograph; *Brushart*, also an artist, standing near.

Brushart.—Is it possible you can so degrade yourself and your art! but don't let me interrupt you, pray; you were saying—

Lovetruth.—That the life which is so short compared with art, thus, by the magic of science, becomes greatly lengthened. The excellence I once despaired of, as unattainable, now begins to dawn upon my efforts; and aspirations which soared far, far beyond my most sanguine hopes, can now almost see their goal. I have not now to pass days and weeks seeking and securing mere details, exhausting those energies which might be expended on loftier tasks, and that time which is so inexpressibly precious to the ambitious painter. No, thanks to my camera, the forms of nature, arrayed in perfect truth, now place themselves smilingly beside my camera, saying, "Master, *we* are here; go forth, then, seek, bring home, and unite to us for ever those lovelier companions of our happier hours—*Colour* and *Poetry*."

Brushart.—Form, detail—bah! Depend upon it, Lovetruth, that comical theory of yours about "the truth, the whole truth, and nothing but the truth," however good in the administration of justice, is a mere mistake in reference to art. It won't do, my dear fellow, it won't, indeed! Look at the sublime conceptions of our immortal Turner, the great art-poet of the world. Where are his details, his forms? and yet how grandly eloquent of beauty and poetry are those masses of glorious colour, and bold realizations of pictorial effect.

Lovetruth.—But is there no poetry of *form* which these productions would be the better for possessing? Colour without form seems to me like thought without speech, or knowledge without the organs of utterance or power of communication. Are our productions the worse, because their meaning may be recognised as easily by the uncivilized savage of the wilderness, as by the loftiest intellect of the most accomplished scholar? Depend upon it, Brushart, our profession has no nobler mission than that of making the high sentiment, the noble thought, or generous passion popular, by so teaching that we are understood by the mass, and not only by a scanty few. In short, you, my dear boy, may preach in double Dutch or classical Latin if you please, I shall address a larger congregation in their native tongue.

Brushart.—As you will; but when I see you, a man of original genius, decending to the position of a mere copyist, hang me! if I can refrain from crying shame on you.

Lovetruth.—Shame on me! why? You copy a sketch made with a pencil, I a sketch made with a camera. The difference in the practice is purely a mechanical one, but in the result, I get the better sketch in the shorter time, and so have the start of you in the race to eminence.

Brushart.—At the last Exhibition all the critics recognised your productions as "mere copies from photographs."

Lovetruth.—Then my "mere copies from photographs" were more true to their originals than my "*mere*" copies of nature were to nature.

Brushart.—Indeed?

Lovetruth.—Just recollect; have you not, "many a time and oft," acknowledged that nature was never represented so faithfully by art as by photography?

Brushart.—Well, on the whole, yes: but, again I repeat, a picture should have higher qualities than those which are strictly imitative.

Lovetruth.—Our arguments on this subject invariably travel in circles of small diameter, and here we are again, once more at the old starting-point.

[*Voices heard without.*

Brushart.—Who are these?

Lovetruth.—First, a brother painter, named Newart, an artist of eminence, whose canvasses are glass plates, and whose pencils are sunbeams.

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* Continued from p. 328.

Brushart.—Bah! you mean a photographer.

Lovetruth.—No! *an artist*—judged by any definition you may please to use—an artist.

Brushart.—Well, and his companions, are they too "eminent" artists? Artists in hair, perhaps, whose canvasses instead of glass plates are bald pates, and whose brushes are shaving-brushes?

Lovetruth.—One is a photographer, the other a paper-stainer named Crackdbell.

Brushart.—You don't mean Crackdbell, the artist, whose ill-drawn, elaborately stippled, waxy-looking water-colour portraits, with their large glass eyes, ridiculously small mouths, and hands no larger than birds' claws, I ventured to ridicule in the pages of ——.

[Enter Newart, Crackdbell, and Process, who are duly introduced to Brushart by Lovetruth.]

Crackdbell.—I have just been receiving some lessons in photography from our friend Process. There seems to be a mania for these photographic portraits, and as one can't starve in a garret merely for the satisfaction of throwing pearls before swine, why, until some improvement in public taste shall revive my own profession, I must e'en stoop to the photographers. Excuse me, Process and Newart, it really *is* a drop, you know, from art to photography.

Process.—As the drop is a mere act of suspension, you must fancy yourself, like your last picture, well hanged.

Newart.—I want your opinion, Lovetruth, upon this last production of mine. It is a landscape exhibited under the effects of the morning mist. I was much struck with the pictorial qualities of the view, and took no small pains for the negative of it which I think very good."

[Lovetruth takes the photograph, places it upon an easel, and, turning to Brushart, asks him, triumphantly, if it is not "a real picture?"]

Brushart.—*As a photograph*, decidedly good; I really could almost say artistic.

Lovetruth.—And why not quite?

Brushart.—Well, after all, you know, it is but a photograph.

Crackdbell.—And wants the life, the soul as it were of nature. Look at the trees, what wind could set that mass of sooty foliage in tremulous motion, look what a sombre pall is spread over the bright green earth. Yonder mass of shadow is as black and opaque as a chimney back, without a single gleam or play of reflected light, or a scrap of detail within it. Look at——

Lovetruth.—At *this* picture, Crackdbell, not at your old stock photograph, and then you will see with me that every square inch of this excellent production is full of gradation, spiritual truth, and artistic beauty. The sprays of foliage, with all their leaf beauty and delicate tracery, standing out against the misty distance, seem to tremble as I look; and I can pierce with a glance into the very heart of that mass of sombre shadow. The blades of grass speak to me of morning dew; the middle distance, retiring into the thickening mist, proves how "distance lends enchantment to the view," by the fairy-like character every object assumes in its retreat, and in the effect of the whole there is breadth, keeping, and suggestive beauty enough to inspire Turner himself. No, Crackdbell, the photograph you were so rashly describing, was taken before our societies, journals, opticians, and chemists had really taken up the art, and it is time your dictionary of photographic criticism was revised and corrected for present use.

Process.—What a pity, Mr. Newart, that you photographed this scene under such disadvantageous circumstances. If you had waited until the mist had cleared off *everything would have been equally distinct, and even the details of distant objects would have been plainly visible.* Whereas now the greater part of your picture is misty, indistinct, and "out of sharp."

Brushart.—Truly how these doctors disagree; Crackdbell can see no good thing in it at all, and Process condemns as defects the very qualities Lovetruth examines in raptures of delight. But I've an appointment and must begone.

Newart.—And I also.

Crackdbell.—I, too, must be going.

Process.—I am about to start on a photographic expedition to ——. You said you would go with me, Lovetruth?

Lovetruth.—And so I will.

And so, presently, they all go their several ways.

A. H. W.

REMARKS ON FAILURES IN ALBUMENIZING, PRINTING, AND TONING.

An interesting paper on this subject was read by Mr. Ewing, at the last meeting of the Glasgow and West of Scotland Photographic Society. As it is rather long we do not produce it here in its entirety. After some introductory remarks, he proceeds to the subject of printing, as follows:

In printing it is always requisite to have a good negative, as you can never produce a good picture from a thin or misty negative. A great deal depends on this, as I assure you the alkaline bath cannot be used unless you have a good dense plate; if you have not, the resultant picture will be thin, bleached, and cold, but with a good negative you can produce fine results. The advantage this bath has over the *sel d'or* is, that there is less bother in connection with it, less tendency to engender acid principles, and consequently it involves the chance of rendering the prints a little more permanent, which is a "consummation devoutly to be wished." With the *sel d'or* bath a moderately dense negative may be used, and still produce a good picture, seeing that it does not require any overdoing of the print; but great care must be exercised in the process:—such as washing them for a long period in clean water, placing them in a bath of weak ammonia, washing again, toning in a solution of gold, hyposulphite of soda, and hydrochloric acid; again washing in ammonia, again in clean water, at last fixing in strong hyposulphite of soda, finally, washing for a long period. With the old hypo bath there was little or no trouble compared with either of the foregoing, and yet I have seen prints quite as clean and beautiful produced with it as with any of the former. It being the oldest method, its faults, in point of permanence, may be more readily observed. But when we place it before the theory of our President—a theory he kindly requested us to consider, and which, if correct, gnaws at the root of our whole art*—it will bear away the laurels in point of permanence, seeing that the alkaline and *sel d'or* baths tone the prints previous to their immersion in the strong hyposulphite bath; the consequence is, that the hyposulphite acts very keenly in the darkened parts, thinning their coating of gold, and, as a consequence, rendering them more apt to be acted on by the actinic rays than the prints which are toned by the old hypo bath, seeing that the chloride is reduced as much as it possibly can be before the action of the gold commences, which action being prolonged, gives a deeper coating, and renders it more able to withstand actinic action. I will now, for a short time, advert to part of the matter advanced by Mr. Stuart, in his paper read at our last meeting. The first item made reference to the permanence of photographs toned by the alkaline bath, in contradistinction to the old system of toning; and he produced two prints of the same age, showing distinctly a yellowing of the whites, which I presume was not the case when they were first mounted. To have made the experiment complete, however, Mr. Stuart should have produced a print toned by each of the two baths, of the same age, and, if possible, with the understanding that the one was as carefully manipulated as the other. The next item Mr. Stuart made reference to, as leading to failure, seemed to me to be the laying of the albumenized sheet on the surface of the nitrate bath, in which he regretted the mode suggested by Thornthwaite, and advanced, as a better method, that of beginning at one end of the sheet, and carefully letting it down until it came in contact with the solution. This we all admit. But further, continues Mr. Stuart, this must be done as carefully as inserting a collodionized plate into the bath, as a stoppage will leave a streak or wave over the whole sheet. Of this I am not so certain, although, had I not been bothered with this same twelve months ago, I certainly would have accepted Mr. Stuart's remark. But happening to have by me a print, which I kept as an example of this wave line, as also of bronzing, I am led to form a different opinion; for, as in the example which I now produce, I cannot think I would stop some ten or twelve times before I had laid half-a-sheet of albumenized paper in the nitrate solution—which was not of the strength promulgated by Mr. Stuart, being only some sixty grains to the ounce, and consequently less liable to stain from careless manipulation. The bronzing also is very apparent. My opinion is, that such streaks (at least in this particular case), result from imperfect coagulation of the albumen. Some makers of albumenized paper do not seem to hot-press the sheets after they have been coated, but simply allow them to dry spontaneously, which drying, I contend, is not sufficient to properly coagulate the albumen. This we may reasonably infer from the amount of animal matter which enters into combination with the bath solution, or from the frothiness of the solution when we return it into the funnel for filtration. It seems to me, and perhaps you will find it to be the case on carefully watching the experiment, that after you have lifted your sheet from the bath, after dipping some ten or fifteen sheets, the solution in the bath begins to get a little reddened (which Mr. Stuart does not object to, but of which I cannot say the same, as I believe that reddening proceeds from a slight precipitate of sulphur), as also to get thickened. Now, from whence comes this reddening and thickening, but through the uncoagulated albumen entering into combination with the bath? The bath becoming saturated with it, will no longer take up the loose albumen from the succeeding sheet, but impart to it an albuminate of silver, which, first drying at the point where it is pinned up, goes on drying irregularly, and thickening as it goes down, leaving a residuum at every stage—hence the wave line and the streaking. This fact also applies to the bronzing, as I believe it to proceed from no other cause than a surfeit of albumen, in conjunction with nitrate of silver, or, what is worse, albumen in a slightly putrid state; and the more am I strengthened in my idea when I remember the fact stated by our President in his paper "On the Influence of Heat and Light in changing the Physical Properties of Bodies." There he pointed to an important result in regard to albumen used as a varnish in the state it came from the egg, as destructive to the material of which the picture was composed; this, he concludes, and I think correctly, to be due to the small quantity of phosphorus and sulphur existing in the albumen forming phosphate and sulphuret of the metal, both of which are subject to re-arrangement of the particles under the actinic rays. Now the albuminate of silver being acted on before, the chloride or the rays of light passing through it before arriving at the actual chloride, produces, according to my notion, the bronzed appearance. This bronze I have often wished to wipe off, that I might get the picture beneath. I do not mean to say that bronzing happens so in every case, but in this particular one it seems certain. The next item touched on was failure, as arising from a mealy appearance in the prints. No solution was offered for this unhealthy phase, but it was stated that the mealiness could be observed in the printing-frame before the print was put into the bath. I have a small specimen of this phase of failure, or what I call mealiness: but perhaps it may not coincide with the mealy notions of others. As this same disease caused some keen discussion last evening, perhaps some of our friends present may have other phases of the same failure. This failure seems to me to arise from the paper which is to be albumenized being of a porous nature, the pores absorbing a greater quantity of the albumen and salting, whilst the more even portions absorb a lesser quantity. On the sheets being subjected to pressure, those pores containing more of the albumen are compressed to a greater extent than the more level portions are, consequently more hardened and horny than the other. The sheet being placed on the silver solution, the softer parts of the albumen absorb a greater quantity of the silver than the horny parts; and if the sheet is quickly snatched from the bath, those more hardened parts not being thoroughly saturated, on being exposed to the light, are not so quickly reduced as the other parts, and here we are enabled to discover the mealiness even in the act of printing. I observe, especially when such prints are placed in the alkaline bath, that those parts which seem to be subjected to most pressure remain brown and horny like, whilst the intermediate spaces become quickly darkened.

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* The theory referred to is stated as follows:—"That the very salt we use as our our fixing solution acts simply as a wash to thin the atoms or molecules which constitute the front of our picture, these atoms being covered with too thin a coating of gold to resist actinic action when mounted and exposed."

With regard to the measles, or those hard gritty specks which mar an otherwise good print, I am not sufficiently familiar with their nature to offer an explanation why they occur; but it appears to me to be the formation of some double salt of sulphur in the body of the paper; for, on burning portions of such paper, I find a blue flame rises at the points where the gritty knots are—a crude experiment indicating the presence of sulphur.

Another phase of failure looms forth in the yellowing of the print. Perhaps this is as troublesome a phase as we have to encounter: it seems to be the most familiar in working with albumenized paper, as I have found it commence on immersing the print newly from the printing-frame into a bath of clean water. I have found the same taking place in the *sel d'or* bath, especially if I was pushing the print to a deep black: the whites turn to that annoying jaundice colour; and I have found the same ignoble colour rise in the print, after passing cleanly through the whole washing and toning process, on its immersion in the hypo bath. Nor is it confined to the albumen paper alone; it peers out often on the plain paper. And even allowing that the print is beautiful from the beginning of the process until the end, having black purple shades, and clear, well-defined lights, is carefully mounted—for a photographer, when he gets a batch of prints through all the circumstances of washing, toning, and dressing, is very mindful of them till the whole operation is finished, which indeed gives him pleasure, as he feels that his labour has been rewarded—how perplexing is the fact that this same disease after a time returns, and that in the space of five or six years we find our darling subjects spoiled by an incurable attack of yellow fever! To the honour of the alkaline bath, be it said, I have found very few failures of this kind, so far as the toning is concerned; but there are difficulties attending the use of this bath also, as one sample of chloride of gold may be stronger than another, which happening, often causes us to lose a good print, from a cold, blueish-black tint, or from the possibility of the alkaline dissolving or softening the albumen, rising blisters, at the back of which hyposulphite of silver gets lodged, which, in the after-washing, it is difficult to clear away. Again, there is a series of secondary failures, resulting from the salting bath being stronger than the silver bath, and *vice versâ*, as also dirty spots arising from air bubbles getting between the surface of the solution and prints, or from prints in the toning or fixing baths lying too closely together; but those defects are more readily cured in comparison with those just enumerated.

Critical Notices.

THE PHOTOGRAPHIC NEWS ALMANAC; or the Year-Book of Photography for 1861. London: Thomas Piper, Paternoster Row.

The value of a Year-Book of Photography has already been recognised and acknowledged. Progress in any science will necessarily be uncertain and slow, unless each step in that progress be carefully registered; and such registration will lose much of its value, if it be not readily accessible to the votaries of the science, the history of which it records. The Photographic News Almanac constitutes a register of the past year's progress, and a reference book for all matters interesting to the photographer relating to the year to come.

Since we cannot with any propriety enter into judgment or criticism on our own work, we will briefly state of what it consists. In common with most almanacs there is the usual calender for the year, and much useful information about the eclipses, postal regulations, &c., &c., &c. The photographic characteristics comprise, in the first place, a series of photographic hints for each month, which are placed at the foot of the calendar. These hints do not consist of a bare statement of the working hours most suitable for photographic operations, but of memoranda of the various conditions of temperature, atmosphere, light, &c., and the corresponding conditions of chemicals, &c., most likely to meet the exigencies of the season, constituting valuable hints for the tyro, and useful reminders to the experienced photographer.

Following these is a valuable list, for constant reference, of the various photographic societies throughout the kingdom, with their officers, exhibitions, days of meeting, &c.

We have next the "Annals of Photography," presenting an interesting synoptical view of the photographic history of the past year, followed by a glance at the art progress of photography. Some interesting articles follow on the results of the solar eclipse, the philosophy of positive printing, &c.

Under the head of "Photographic Processes and Formulæ" are a series of practical articles embodying the most recent *tested* improvements in the various processes described. The subjects treated are the manufacture of collodion, the nitrate of silver bath, iron development and intensifying of negatives, instantaneous photography, carbon printing, photographic enamelling on glass, and alkaline gold toning processes and their requirements.

New and modified processes of various kinds, proposed during the year, are next briefly stated, and constitute a basis for further experiments, rather than a record of processes and formulæ which have received the approval of universal experience.

One of the most interesting chapters to amateur photographers is that headed "Dry Processes," which contains a complete statement of all the dry processes as at present practised, comprising not only the discoveries and modifications suggested during the past year, but those which have been long tested and approved. These range under the heads:—the Collodio-albumen Process, Petschler and Mann's Process, the Hot-water Modification, the Rosin Process, the Malt Process, the Linseed Process, the Gelatine and Metagelatine Processes, the Fothergill Process, Dry Process without preservation, and the Glucose Process, together with hints on the management, development, &c., of the dry processes generally.

A variety of useful miscellaneous matters follow, referring to patents, photographic patents during the past year, apparatus, &c., and a series of chemical and other tables. Amongst the latter we may call attention to a new table of distances for enlarging and reducing in the camera, giving the exact position to be occupied by the lens, the ground-glass, and object to be copied, respectively. The information on this subject is simpler and fuller than any we have seen before, and the table, which has been calculated expressly for this purpose by Mr. Hannaford, includes from reducing to one-fourth to enlarging six times, with lenses from 4½ inches to 20 inches focus.

We believe we are fully justified in stating that the work will be found to constitute a perfect year-book of photography, presenting a complete epitome of the present state of the art.

THE HOLIDAY IN THE WOODS. By H. P. Robinson.

We have before us one of the most ambitious, and at the same time one of most successful, composition photographs that have yet been attempted. We say ambitious, because despite the real difficulties in the way, and they are neither few nor insignificant, despite the manufactured difficulties interposed by pseudo-art critics, who pooh-pooh the thing as altogether impossible, and the difficulties produced by the depressing criticisms of those who love art and appreciate photography, but deprecate composition as out of its province, and stigmatize the attempts in that direction as "patchwork"—despite all these things, Mr. Robinson has essayed to compose a picture of almost unrivalled dimensions by the sole aid of photography.

We are not now going to discuss the legitimacy of composition printing, or the production of one picture from several negatives; neither are we about to consider the long-mooted question as to how far imitation is true art. If indeed the true aim of art be, as it is often asserted by a certain class of writers on the subject, to idealize nature and not to imitate it, then truly is the province of photography in art a narrow and humble one—a hewer of wood, a drawer of water, even a shaper of stones, but in no sense even the builder, not to say the architect, of a noble edifice. Photography in this case may furnish studies, but it must not presume to make pictures; and composition photography must in that case, of course, be tabooed altogether. But if, as we hold, the highest idealistic power which art can possess, consists but in the selection, arrangement, and combination of what really exists and is seen; if the most glorious genius can but reproduce nature in its most glorious forms, just as he sees it under the most charming conditions; if he cannot rise beyond his source, then photography may hope to bear a place in the most exalted walks of art, and compositive photography needs but the artist's power of selecting and combining, added to sufficient manipulatory skill, to meet and overcome mechanical difficulties, in order to produce pictures, real pictures, of the highest order of excellence.

"Are our faults to be eternal?" was a question asked some time ago, by Mr. Robinson, in the course of a discussion which arose on this subject. The picture before us furnishes a practical negative answer. Mr. Robinson has produced a good many composition pictures of various gradations of merit, and we may add, without intending to be offensive, of demerit. Amongst the specimens we have seen, there have been good, bad, and indifferent; but we may unhesitatingly pronounce this to be his best as well as his most ambitious work.

The picture is twenty-two inches by seventeen, and consists of ten figures, which, with the woody background are produced from seven negatives. The subject is a holiday in the woods: a background of thick foliage, consisting of trees taken at Kenilworth, forms a delightful scene for enjoying the holiday. The figures are entirely rustic, consisting of peasant children in every variety of position; walking, sitting, reclining; abandoning themselves to the pleasures of the hour. In the foreground a little chubby child with a lap full of flowers submits, with a look half-enjoyment, half-endurance, to have her head dressed with a wreath or chaplet of flowers with which an elder sister, kneeling by her side, invests her. A little further back a group of three girls recline, also engaged in weaving flowers, one of whom, with a face beaming with fun, is watching the effect of the head-dress we have just described. A little further off is another group apparently engaged in the pursuit of a butterfly, the arm of one, hat in hand, just being raised to make a dash at it. In another part of the picture two distant figures are approaching the scene to join the holiday party; whilst in one corner of the foreground a boy reclines watching the whole, and is apparently in charge of a basket which doubtless contains those comestibles without which, alas, even holidays would be dead failures.

One of the chief excellences of the work is its perfect keeping. The scene is in sunlight, and notwithstanding the number of negatives, the whole is most harmoniously lighted, the strength of the light and the mode in which it falls, throughout the picture, presenting no anomalies. It is in fact as perfectly lighted throughout, as if it had been produced at one time on one negative. The chiaroscura is on the whole good: but we should, if the printing were under our own direction, prefer to make some slight modifications. We would, for instance, keep the left hand corner of the foreground a little lighter, so as to make the mass of shadow cast by the boy with the basket, the deepest in the picture. We should prefer also to mask considerably the dark drapery against which a sunlighted cheek in the foreground cuts with all the "cruel lines of the scissors." If the drapery against which this cheek cuts, were lighter, this necessarily hard line would not be so apparent. The foliage in the background, though not intended to be very distant, we should like to see thrown back a little, by means of lighter printing, the effect of which would be to give additional value to the foreground.

The composition and grouping of the picture are altogether good, and full of truth and spirit.

The chief faults are mechanical, and consist in some hard lines most difficult to avoid, but at the same time marring the effect of a perfect picture. Some of these are aggravated by sunlit figures cutting hard against dark drapery, or dark foliage. An unpleasing effect would result if these had been photographed so, but the effect is of course more apparent when the junction is a mechanical one. We remember Mr. Robinson to have said that Mr. Rejlander could join the portions of a picture so that he (Mr. Robinson) could not find the outline. We believe this to be the fact; but fancy that in such cases, he would select for the points of junction, either such parts of the picture as presented less contrasts, or required less tender outlines than a girl's cheek. We think Mr. Robinson can produce better pictures even from these negatives, and unless our memory is at fault the one before us is better than one we have seen. The work has so much real excellence, and so many of the points of a first-class picture, that we the more regret these minor and mechanical faults, which it is but fair to say are by no means prominent or striking.

As a photograph the picture is unexceptionable, and when we remember that under favourable circumstances, the printing is a week's work, the tone is a marvel of excellence.

We have a final hint for impatient photographers, as to the sources of success. Mr. Rejlander recently informed us that one of his best pictures was two years "hatching;" Mr. Robinson informs us that this picture was conceived and designed three years ago, and a "scene made and planted expressly for it" at that time. We leave the moral for those who need it. to apply.

PERMANENCY OF SILVER PRINTS.

The following remarks are extracted from a brief article on photography in the new edition of "Ure's Dictionary of Arts," edited by Professor Hunt. The fact that they are from the pen of one of the most accomplished and earliest votaries of photography, who has been long silent on the subject, will give the remarks additional interest.

The most important part of photography, and one to which the least attention has been paid, is the process of rendering permanent the beautiful images which have been obtained. Nearly all the fine photographs with which we are now familiar are not permanent. This is deeply to be regretted, especially as there appears to be no necessity for their fading away. In nearly all cases the fading of a photograph may be referred to carelessness, and it is not a little startling and certainly very annoying, to hear a very large dealer in photographic pictures declare that the finest pictures by the best photographers are the first to fade. Thi is no doubt to be accounted for by the demand which there is for their pictures leading to a fatal rapidity in the necessary manipulatory details.

There is no necessity for a photograph to fade if kept with ordinary care. It should be at all events as permanent as a sepia drawing. The hyposulphite of soda is the true fixing agent for any of the photographic processes, be they Daguerreotype, calotype, collodion, or the ordinary process for producing positive prints. It should be understood, whichever of the salts of silver are employed, that by the action of the solar rays either oxide of silver or metallic silver is produced, and the unchanged chloride, iodide, or bromide can be dissolved out by the use of the *hyposulphite of soda*.

The photographic picture on paper, on metal, or on glass, is washed with a strong solution of hyposulphite of soda, and the silver salt employed combines with it, forming a peculiarly sweet compound, the hyposulphite of silver; this is soluble in water, and hence we have only to remove it by copious ablutions. The usual practice is to place the pictures in trays of water and to change the fluid frequently. In this is the danger. and to it may be traced the fading of nine-tenths of the pictures prepared on paper.

Paper is a mass of linen or cotton fibre; howsoever fine the pulp may be prepared, it is still full of capillary pores, which, by virtue of the force called capillarity, hold with enormous force a large portion of the solid contents of the water. If we make a solution of a known strength of the hyposulphite of soda, and dip a piece of paper into it, it will be found to have lost more of the salt than belongs to the small quantity of water abstracted by the paper. Solid matter in excess has been withdrawn from the solution. So a photographic picture on paper holds with great tenacity one or other of the hyposulphites. By soaking there is of course a certain portion removed, but it is not possible, by any system of soaking to remove it all. The picture is, however, prepared in this manner, and slowly, but surely, under the combined influences of the solar rays and atmospheric moisture, the metallic silver loses colour, *i.e.*, the photograph fades.

The only process to be relied on demands that every picture should be treated separately. First, any number may be soaked in water, and the water changed; by this means the hyposulphite of silver is removed. Then each picture must be taken out and placed upon a slab of porcelain or glass, and being fixed at a small angle, water should be allowed to flow freely over and off it. Beyond this the operator should be furnished with a piece of soft sponge, and he should maintain for a long time a dabbing motion. By this mechanical means he disturbs the solid matter held in the capillary tubes, and eventually removes it. The labour thus bestowed is rewarded by the production of a permanent picture, not to be secured by any other means.

Photographic Tourist.*

A FEW DAYS ON DARTMOOR.

Hounditor is described by Rowe† as being one of the most interesting of the tors on the moor. He says "The top of the hill is flanked by two colossal walls piled up of huge granite masses, sixty, eighty, and in some places, probably a hundred feet high, with an open space between, forming an esplanade where Titan sentinels might have paced along, or rebel giants might haveheld a council of war." Under more favourable circumstances I should have taken away many reminiscences of this spot, for there was no lack of subjects from which to choose.

About two hundred yards S.W. of the summit is a good specimen of the kistvaen, or stone chest, generally considered as designed for a sepulchre in which were deposited the ashes or bones of the deceased. These "stone coffins" are rather numerous on Dartmoor, and in some, cinerary urns have been found. Moormen have a general impression that treasure is buried within them, and I was once told by a rather intelligent rustic, when speaking of one near Yartor on the Dart, that "he'd heerd tell that a crock o' goold was buried under 'un. He wid'n't say but that one time or nother he'd take haf a day an' try an' see. He'd bet nor man a guinea he'd find summat."

The kistvaen at Hounditor is formed of four stones, placed edgeways, the cover being gone. It is about six feet in length, and surrounded by a circle of stones, perhaps thirty feet in diameter. The stones from about the third part of this circle have been removed, probably for "uses." I should have taken a photograph of it had it been at all possible, but was obliged to be contented with a pencil sketch.

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* Continued from p. 343.

† "Perambulation of Dartmoor."

Taking the road which runs across the Down below this Tor, I soon reached that remarkable pile of rocks called "Bowman's Nose," consisting of immense granite blocks piled by nature's hand to a height of from forty to fifty feet. It presents a rough colossal resemblance to rude Hindoo idols.

In spite of the high wind, I determined to get a photograph of this Druidical curiosity. So choosing the best available position, I planted the camera on a granite boulder —not on the tripod—and piling stones around it, managed to obtain a tolerable negative.

Leaving the pretty village of Manaton on my right, and crossing the South Teign, I reached Moreton Hampsted at about seven o'clock, tired and hungry enough. At the White Hart I obtained such accommodation as I did not expect to find in this "outlandish" place. On the walls of my sitting room were several photographs of the neighbourhood, taken by a gentleman, from Bristol named Morgan, a few years back.

Moreton Hampstead is a very pretty little town. The streets and buildings are ancient, and somewhat irregular; all the better for the photographer. The position is very central, and the tourist would do well to make it his head quarters for a few days, if his time would permit.

Next morning the weather was promising, but uncertain, when I set out for Fingal Bridge, on the Teign. On ascending the hills from Moreton, the rural scenery is very enchanting, especially after passing the little hamlet of Howton. On the left we just catch a glimpse of Moreton, whilst villages and farms, peeping out between the trees and orchards, dot the landscape in every direction.

About four miles from Moreton, overlooking the Teign, is Cranbrook Castle, perhaps the most important of the Dartmoor border fortifications. It consists of an embankment surrounding a space of from six to seven acres. Towards the south it presents a somewhat formidable appearance, the rampart being doubled, with what might possibly have been a dry ditch between. From the bottom of the ditch to the top of the inner rampart, the perpendicular height is about twenty feet. On the west the embankment becomes much smaller, whilst on the southern side it almost dwindles into nothing, the steepness of the hill rising from the Teign offering considerable natural protection. Not long ago the worthy parish authorities carted away nearly the whole of the east side of this interesting British relic, for the purpose of repairing the roads. Fortunately the spoilations of these Vandals was put a stop to, through the representations of one or two antiquarians at Plymouth.

From here we obtain an extensive view of the neighbouring country. Below, towards the north, is the vale of the Teign, on the opposite side of which, the hill is crowned by the village of Drewsteignton, which, with its moorstone church tower, looks a charming little retreat. Away to the west is the tower of Gidleigh church; beyond rises a fine bold sweep of moor. From the north-west round to the east, the eye wanders over a fine expanse of finely wooded champaign country, until it becomes lost in misty distance. Towards the south and south-west the extensive and fertile looking valley in which stands the little town of Chagford together with numerous hamlets and farms, more particularly claims attention.

A steep zig-zag road leads from this interesting spot to Fingal Bridge. About half way down a sudden bend opened a splendid peep of the river, glistening at the foot of the precipitous wooded hills, which close one over the other. Quickly setting up my camera, I prepared to expose a plate, but the weather seemed determined to do all in its power to prevent my obtaining a photograph. At first a few large, single, angry drops came pattering down, and I had scarcely taken the cap off the lens than the water fell in torrents, and I was only too glad to run to shelter. The plate was of course useless, but I am glad to say this was my only *absolute* failure.

At the next bend of the road, a scene burst on me which was unsurpassed by anything I had met with on Dartmoor. On the Dart there are some beautiful spots, which, perhaps, equal this, but I know of none which are superior. Five hills, covered with wood, fold alternately, on either side, one over the other, until the blue moors close in the view. The river winds along at the foot of the nearest hill, and here only is there room for improvement; what portion we do get is very well, but we want more. In spite of the rain I took a sketch of this charming scene, and propose making a water colour drawing from it, when an "artist's licence" will enable me to overcome that difficulty of the smallness of the river.

Fingal Bridge in itself does not present an object of interest, but the scene from it looking down the river is very lovely. It is, nevertheless, a subject for the pencil rather than the camera; it requires the imagination to give it character and feeling. On the left, a noble hill towers above you, on the summit of which is Prestonbury Castle, a British fortification, similar to that of Cranbrook, described above. A clump of trees scarcely hides Fingal Mill from view, whilst beyond it we have a beautifully wooded hill for a background. For a foreground we get the river, with some small tree shrubs on its banks, and a patch of bright green meadow sward, which, by its intensity, tones down what might otherwise be a too green landscape.

From Fingal Bridge a rough track follows the course up the river. Along this a carriage can drive for about a mile only, whilst the equestrian may proceed, perhaps, as much farther, and the pedestrian, as a matter of course, as far as he pleases. The scenery as we go on is only *pretty;* it lacks the rocky bed and rushing torrents of the Dart, just as we see it when it "comes down,"—a local phrase in connection with that river, the meaning of which I will tell you at another opportunity.

The famous logan stone on this river was the object of my search, and by keeping close to the water I had no difficulty in finding it. It stands in the bed of the river at from two to three miles from Fingal Bridge, and can readily be distinguished from the granite boulders which surround it. The shape of this mass is pentagonal, its sides, excepting that towards the river, which is about ten feet long, averaging from five to six feet in width. This at a rough estimate gives about five hundred cubic feet of stone, resting so lightly on a single rock that it is said it can be moved by the application of one man's strength. On trial, however, I could not produce any sensible motion.

After some trouble in clearing away brushwood, I obtained a favourable point of view for a photograph, and exposed a dry plate. On development it proved to have been a little under-exposed, but otherwise very good.

(*To be concluded in our next.*)

Correspondence.

PHOTOGRAPHY IN GERMANY.

Elberfeld, November 22nd, 1860.

DR. SCHNAUSS, of Jena, has analysed the "Encre Photographique," which is sold and much recommended in Paris; he found it to consist of water, nitrate of silver (one-third or one-fourth), some alcohol, and nitrate of potash. The latter salt being very cheap and sold in the "encre" at about the same price as nitrate of silver, there seems to be a fine profit in the sale of this preparation, manufactured by the "Société des Encres Photographiques, à Paris, Rue Lafitte."

Professor de Roux, of Cassel, a celebrated painter, and a skilful and zealous photographer, has produced some excellent life-size pictures by the new enlarging apparatus, manufactured by the Elberfeld Photographic Institution. Writing to the *Photographisches Archiv*, on this subject, he says: "We had a day where the sun was clear, and produced a copy in one hour more excellent and beautiful than we have seen effected by any other process."

M. Cozics, of Presburg, communicates the following formula for a negative developer, giving fine modulations and vigorous proofs:—

Protosulphate of iron	180 grains.
Acetate of lead	180 ,,
Distilled water	20 ounces.
Acetic acid	1 ounce.
Alcohol	1 ,,

There will appear next month at Berlin a "Photographic Almanac for 1861," containing a photographic copy upon albumenized paper.

In the *Photographisches Archiv*, Dr. Schnauss communicates a simple process for making small concave mirrors by the aid of photographic solutions. You know there are already many great manufactories of silver mirrors in Germany, but these make only plain mirrors—reducing the silver by grape-sugar—concave mirrors being very difficult to manufacture by the known processes.

This is also an interesting experiment to show the ability of reduction of certain substances. Clean in the usual manner, or with spirit and tripoli, a concave glass (a watch-glass, or the cut-off bottom of a glass-alembic). When it is quite dry and clean, so that the breath of the mouth is equally condensed, pour some iodized (alcoholic) collodion in the middle of the concave glass, swing and turn it skillfully, so that the inner surface of the dish is thoroughly coated. The excess of the collodion is poured off, and the glass turned downwards until the collodion no longer flows.

Afterwards, in the dark room or in the daylight, quickly pour enough nitrate bath in the dish to fill it entirely. The iodide of silver being formed, pour off the bath, and bring the dish (if it has been coated in the dark), a few seconds to the day-light. Fill the dish quickly with a diluted solution of sulphate of iron; this solution should be acidified. The reduction ensues instantly, and so perfectly that the inner concave side of the dish is covered with a good compact film of metallic silver in a fine divided state. It may be strengthened by further alternative pouring on the nitrate and sulphate solutions.

Finally wash the dish with pure water and dry it before a fire. The reduced silver is then to be *cautiously* polished by cotton.

From the softness of the collodion film, or rather from the tender crystalline deposit of the silver, the glass cannot compare with that of compact polished silver; but it is sufficient to make burning-experiments if the concave mirror is not too small.

If you acidify the bath and the iron solution with nitric acid, and expose it only a few seconds to the light of the day, the silver mirror becomes of a beautiful white colour.

After my printing process upon arrowroot-paper was published the objection was made by an English contemporary, that the old sel d'or toning-bath had been recommended. This process is yet preferred in our country, because most German portraitists make feeble negatives, full of half tone, and feeble copies are better to be toned by the sel d'or process; but recently a member of the German Photographic Society, M. Belitzki, of Hamburgh, added to the society's circulating portfolio some prints upon arrowroot-paper, toned by the alkaline chloride of gold bath, which were indeed excellent in every respect. I tried the same bath, and found it to answer perfectly well with the arrowroot-paper. I should recommend the following formula:—

Distilled water	2 ounces.*
Chloride of gold	1 grain.
Carbonate of soda, to render the solution neutral, about ...	5 grains.

With respect to the chloride of gold, it seems to be impossible, or rather difficult, to prepare neutral chloride of gold in a solid state.

The process given by Mr. Fordos, referred to in previous numbers of this journal, and described originally in the March number of the *Bulletin de la Société Français de Photographie*, it is impossible to execute, if you prepare the "chlorure d'or et de potassium" exactly after the given formulæ, you get a neutral salt, which is partly insoluble in water, and the soluble part of which colours the whites of the print to a decided yellow. These are the results I have got several times, and three distinguished German chemists say the same. Another argument is, that two English "neutral chlorides of gold" which I tried, as well as Mr. Fordos's, of Paris, own manufacture, have been found *acid*, very acid—and that perhaps is the most deciding argument of my doubts. If you add some carbonate of soda to these neutral-called auro-chlorides of sodium, they will equal the pure chloride of gold in their results. Of course the "chlorure d'or et de potassium" is not so deliquescent as the pure chloride of gold, and therefore it is more agreeable to weigh out and to keep it, but you must not rely upon its neutrality. In Germany the Fordos salts, containing about 88 per cent. of gold, are called "gold chlorid kalium," and "gold chlorid natrium," to distinguish them from the "chlor. gold natrium," the mere mixture of equal parts of chloride of gold and chloride of potassium or sodium, which contains only 50 per cent. of chloride of gold.

The alcoholic collodion progresses in the favour of German operators; it seems to be well fitted for hot climates, as the accounts of some correspondents in Brazil, Cape Town, and the West Indies state. Also the lithium-iodizer is much used, although many fear the increased price (one ounce of lithium salt costing about ten shillings); but the collodion is very sensitive, and I like it more than any other.

Paul E. Liesegang.

[We must apologize to our readers for the absence of our usual "Paris Letter," which had not arrived at the moment of going to press.—Ed.]

Proceedings of Societies.

Blackheath Photographic Society.

The ordinary meeting of this society was held November 19th, 1860, C. Heisch, F.C.S., President, in the chair.

The minutes of the last meeting having been read and confirmed,

The President announced that T. R. Wheeler, Esq., had resigned the office of secretary. He then said, I regret to inform you that I have just received a note from Mr. Heath, stating that he is unavoidably prevented from being with us this evening, and we shall consequently be deprived of his promised communication; but, he adds, we may make quite sure of it for our next meeting. He has sent down some very beautiful views which he has lately taken in Devonshire, to one of which I would particularly call your attention, as it was taken with one of Ross's orthographic lenses of the smallest size, a lens intended only to cover a plate 8¼×6½, but which has here, as you see, completely covered one of 12×10 inches: if you examine the picture you will find it perfect to the edges, and the distance and foreground are most beautifully given. The focal length of that lens is as nearly as possible the same as the length of the picture. I have myself used a similar lens on plates 10×8 (the largest my camera will take) with equally good results. I will now, as we have no regular paper, make a few remarks on a subject of great interest and importance to us all, the printing and toning of positives. You all know that a new system of toning has recently been introduced, I mean the alkaline gold toning, as it is called. This process has so many obvious advantages over the older method of toning, that I think the other side of the question has hardly been enough considered. The obvious advantages are its rapidity, the ease and certainty with which any desired tone may be obtained, and the fact that hardly any over-printing is required; but what has been put forward as its chief advantage, is the greater stability of the prints so toned. It is on this point that I do not feel so certain. We have not yet kept any prints thus toned for anything like the same time that we have those toned by the older process, and the theoretical reason (the only one at least which I have ever heard) given for this supposed greater stability, does not seem to me sufficient; it is that in this process the decomposition which takes place when chloride of gold is mixed with hyposulphite of soda, which results in a deposition of sulphur is avoided. Granting that this is one cause likely to produce fading, let us examine the two processes side by side. I may say at once that by the old process I do not mean such manifest absurdities as placing prints in the toning-bath without washing out the nitrate of silver, or still worse, for the sake of getting a good tone quickly, adding nitrate of silver to the toning-bath. To prevent all mistakes I will just mention the process I have used for years, during which I have not had a single case of fading. Make a solution of hyposulphite of soda 1 part, water 2 parts. Dissolve your chloride of gold (the quantity must vary according to the tone desired) in a quantity of water equal to half that used to dissolve the hyposulphite, add to it sufficient bicarbonate of soda to make it distinctly alkaline, and pour it gradually into the hyposulphite solution, stirring well all the time; allow this to stand till colourless, and should any deposit take place, filter. When the prints have been completely washed free from nitrate of silver, immerse them in this till the desired tone is obtained; rinse them well in water and plunge them in a bath of clean hyposulphite, containing one part in six of water, allow them to remain in this for at least fifteen minutes, and then wash elaborately in cold water. Now any decomposition which takes place here, is between an alkaline chloride of gold and hyposulphite of soda, and any deposited sulphur may be filtered off. In the new process the prints after being washed are placed in a mixture of chloride of gold and bicarbonate of soda, and when toned are taken, saturated as they are with the solution, and placed in hyposulphite. Here we have the same substances to act on each other, but this time in the very body of the paper, so that if any deposit occur, it will be in the paper, which I should think if anything, worse than in the bath, where it may be filtered off. As a matter of fact I would mention that the only prints I have which show any symptoms of fading are some made within the last year, and toned in the alkaline gold bath. Prints toned on the older plan have been subjected to all fair usage, such as lying about on the table, sometimes being kept in the dark and then again exposed to light, being for a long time in rooms where gas is burnt, some have been a sea voyage, and one, which I now produce, was taken over to New Orleans simply in a lady's travelling trunk, without any glass over it, remained for six months in the warm wet atmosphere of New Orleans, which is particularly trying, and made a tour through Canada on its way home, yet it shows no signs of fading, thus proving that prints toned on the old system may be made to stand even severe tests. I endeavoured to ascertain which prints contained the most sulphur by the following experiment:—I divided a sheet of sensitive paper into 3 equal parts by weight, exposed one half of each to light, washed the first simply in water, toned the second in alkaline chloride of gold, and the third in the old toning-bath. All three were then boiled in nitric acid, and the sulphuric acid formed estimated in the usual way as sulphate of baryta, the paper which had been simply washed serving as a starting point. The quantity of sulphate of baryta was in each case, however, so small, that any differences came fairly within error of experiment. I shall repeat this experiment on a larger scale, as at all events a knowledge on this point will be something gained. I do not wish to lay too much stress on the fading of the prints beforementioned, as they were printed in a very bad light, and I can quite bear out what Mr. Thomas said in his late paper on printing, that prints done in bright sunlight are much less liable to be injured than those done in a weak diffused light, indeed I am not sure that the over-printing necessary in the old process does not conduce to the safety of the prints, even though they are brought down in the hyposulphite; they seem, so to speak, more fairly baked into the paper. This leads me to notice one thing with regard to printing in direct sunlight, not, I think, noticed by Mr. Thomas, viz.: that sunlight penetrates the dark parts of a negative more in proportion to the lighter parts than diffused daylight. I have here a print of a coast scene printed in sunlight, in which the distant cliffs are well defined, while the foreground is not over done. If an attempt be made to print from the same negative by diffused daylight, the foreground may be completely burnt up, while scarcely a trace of these cliffs is visible.

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* We print our correspondent's formula as he states it; but we cannot but think there is some error here. One grain of chloride of gold to two ounces of water, would not only be unnecessarily, but unmanageably strong, especially with German paper. Ten ounces would be better.

Mr. Glaisher said his experience also bore out the statement of the superior permanence of sun-printed pictures.

Mr. Scaife said he had found that a very weak negative, almost a positive, might be printed well by direct sunlight which could not be made anything of in diffused light.

The Chairman then called attention to some stereoscopic views which he had taken in North Devon by Mr. Sisson's raspberry syrup process. He also remarked that the collodion employed was some made *from paper six years ago*, which he thought a pretty good answer to those who asserted that collodion made from paper carried in itself the seeds of its own decay, this having been kept so long, and through the unusually hot summers of the two or three preceding years.

Mr. Scaife exhibited some of his chromo-crystal portraits, taken with the pistolgraph, adopted for setting in rings and brooches, amongst others a portrait of Sir David Brewster.

After a short discussion on the printing of the pictures for distribution to the members of the society, the meeting adjourned.

NORTH LONDON PHOTOGRAPHIC ASSOCIATION.

The ordinary monthly meeting of the society was held on the evening of Wednesday, the 21th instant. G. Shadbolt, Esq., in the chair.

The minutes of the previous meeting having been read and confirmed,

Mr. Moens read an account of a yacht trip of nearly twelve months in the Mediterranean, detailing his various photographic experiences. He had operated with wet collodion, using a dark box, which he had had made for the purpose, and in which he packed all his chemicals and apparatus. A variety of fine specimens produced during the trip were exhibited, and elicited much admiration.

Mr. Fry asked if Mr. Moens had used the salts of iron for development.

Mr. Moens had not used iron. His developing solution consisted of three-fourths of a grain of pyrogallic acid, one-fifth of a grain of citric acid, and five drops of acetic acid to the ounce of distilled water.

The Chairman remarked that from the excessive actinism the use of iron would have been a disadvantage. Mr. Moens had had to restrain as much as possible the action of light.

In the course of a conversation which followed, Mr. Moens remarked that the foreign photographers he had met generally used the dry processes, the albumen process being most common. They could not make much of wet collodion for landscape purposes, and their tents were clumsy affairs. He thought it something to say that he had taken out a glass bath and brought it home again without breakage. A vote of thanks to Mr. Moens having been passed,

Mr. Skaife introduced his pistol camera or pistolgraph to the meeting, and showed how it was used. In explanation of the term pistolgraph as applied to his camera, for the use of which he had often been challenged, he made the following remarks:—I have been asked over and over again why I call a certain little photographic instrument a pistolgraph, and over and over again I have replied by saying, because the little instrument, when first invented, was in size and shape not unlike a pistol—was held in the hand and manipulated by means of a trigger like a pistol. One being constructed to take life, the other likeness. The pistol camera, constructed to take pictures on concave glasses, was first introduced to the public about two years ago; but on being modified to do pictures on flat glasses, it took the name of pistolgraph. The termination -camera being exchanged for -graph. Camera, though very euphonious in photography, is at best but *à pis aller*, as the French would say. Camera in the original Italian signifying a room, parlour, or bed-chamber. A photographic camera is understood as the instrument by which photographs are taken. But with more propriety, from a linguist's point of view, this name should be given to the photographer's dark operating room. In this respect the French are not much in advance of ourselves, for they call their camera *à photographic chambre noir*. Telegraphy in its terms is much in advance of its sister science photography. The close relationship between light and electricity suggests a relationship in their several terms. The electric telegraph is the quickest instrument known for the conveyance of messages. The photo-pistolgraph is believed to be the quickest practical instrument known for the taking of children's portraits. By common consent a telegraphic message is now called a telegram. Why may not, with equal propriety, a picture (a light engraving if you please) in black and white be called a pistolgram? Life is short, but art is long. The craving for new ideas is inexhaustible, but eyes will wear out. Commercially speaking, short terse words pay better than long euphonious phrases. In print the latter cost sixpence more—a sordid consideration, truly; but still it has its weight with those who work for bread as well as fame. He then introduced to the meeting the pistol camera, as originally made for use, with concave glasses. One he had made for the purpose of trying to photograph the flour snake, when magnified by a Stanhope lens, had the shutter movement so rapid for unclosing the lens, that, in the first instance, when he examined, he fancied there was really no movement, as he absolutely could not see it; and it was only by holding it between the light of his eye and then pressing the trigger that he saw there was a momentary spark of light admitted. He then proceeded to explain the manipulation of the camera, and the use of his bag containing the nitrate of silver bath, bath of iron developing solution for dipping, and bath of salt and water, which were used in operations out of doors.

A member asked what description of lens Mr. Skaife used.

Mr. Skaife stated that it was a double combination, of about five-eighths of an inch diameter, made expressly for the purpose, by a celebrated optician (Mr. Dallmeyer we believe) who was under contract to make them solely for himself (Mr. Skaife).

A small camera for similar purposes, by Ottewill, was exhibited, the shutter for closing the lens of which was very rapid in movement, but not nearly so rapid as that of the patent shutters attached to Mr. Skaife's camera. A number of very fine specimens of "chromo-crystals" were also exhibited and much admired.

Mr. Fry asked if Mr. Skaife had tried the use of shutters opening inside the camera, and stated that the plan he had found most effective was the use of such shutters, and opening downwards. By that means the part of the lens giving the image of the foreground was exposed longest, the light being then admitted first and excluded last. By having the shutters inside he thought vibration was better avoided, a thing of some importance in instantaneous operations.

Mr. Skaife said his shutters could be made to open in the way Mr. Fry indicated. He should have thought, however, that Mr. Fry's instantaneous views being chiefly sea pieces would scarcely have required one part exposing before the rest, as the water reflecting light would require no more exposure than the sky.

Mr. Fry said he had not been referring to marine photography especially, although even there, the green colour of the sea, notwithstanding the amount of light it reflected, would sometimes be better for longer exposure than the sky.

Mr. Morley then exhibited a new mount for lenses which he had contrived, which was attached to a portable folding Kinnear camera, and which occupied so little space that the lens might remain *in situ* when the camera was packed up. The diaphragms were a series of different sized apertures in a evolving disc attached to the front of the mount. It combined the advantages of lightness, portability, and cheapness. The complete mount and diaphragms can, we understand, be supplied for about ten shillings.

Votes of thanks were passed to Mr. Skaife and Mr. Morley.

The Chairman then announced that arrangements had been made with Mr. Wilson, of Aberdeen, for supplying one of his beautiful photographs as the presentation picture to the members of the society.

The proceedings then terminated.

Photographic Notes and Queries.

OXYHYDROGEN APPARATUS.

Dear Sir,—One of your correspondents, who is evidently enquiring about the oxyhydrogen apparatus, appears to be recommended by you to mix his gases in one bag, and use a tube filled with wire between this and the point of ignition.

Let me advise those who wish to avoid accident to *keep the gases separate* until they have passed through a tube rammed full of fine brass *wire gauze*, which is cut in the shape of pellets or gun-wads. A *couple of dozen* of these is sufficient to prevent accident by regurgitation of the flame, provided a regular, equal, and sufficient pressure, is maintained upon each gas-bag. The gauze should be situated about two inches from the jet. —Yours faithfully, S. S. B.

P.S.—A good substitute for ground-glass may be made by pouring over a glass plate a thin solution of starch. Drain and dry. Or by using a solution of sulphate of zinc in the same manner.

I have seen the enquiry made in your journal, and take this opportunity of replying to it.—S. S. B.

TRANSFERRING POSITIVES.

Central India, Kamptee, October 19th, 1860.

Sir,—In number 105 of your journal I observed a letter from "Spx," requesting information about transferring positives to paper. I beg to enclose a recipe for the whole proceeding, which I trust may be of use to him and others of your subscribers:—

Borax	1 drachm.
Shellac	1 drachm.
Water	5 ounces.

Boil, and before cool add:—

Spirits of wine	1 ounce.

When cold, add as much lampblack as it will take up, and strain through a cloth; with this, by means of a broad camel-hair brush, coat the paper (Canson's positive is the best) until it is perfectly opaque and smooth; the paper may either be pinned out by the four corners to dry, or by the two top corners only. In the latter case it will roll up when dry, which is an advantage, as it affords a test in the after process, as I am about to describe.

Coat the positive three times with a varnish composed exactly as the first, with the exception of the lampblack, taking care to let it dry between each coat. When the last coat (the third) is dry, cut out the black paper to sizes a little larger every way than the pictures, and lay them *rolled up* in a vase of water. *As soon as they uncurl of their own accord and lie flat on the water*, take one out and lay it on blotting-paper, and give the black side, and also the positive, a coat of the varnish before used for the picture, and lay them together, carefully pressing out all air-bubbles. Lay the two on the table, paper underneath, place a bottle or some light weight on them, and leave them thus till thoroughly dry. It takes on an average three hours in this country, and of course will take longer in England, then plunge into water, and in ten or fifteen minutes take out and carefully peel.—I am, dear sir, &c.

H. R. Spearman, Lieut., 91st Rgt.

INDIA-RUBBER SOLUTION.

March, Cambridgeshire, Nov. 26th, 1860.

Sir,—One of your correspondents requires a formula for a solution of india-rubber. I beg to forward the following, and have the honour to remain, very truly, yours, Clipson Wray.

Take caoutchouc half a drachm,
Slice it and in a bottle cram;
To this add benzole ounces six,
They won't at first appear to mix,
Digest some hours before the fire,
If that don't make it I'm a ——Squire.
Should it turn out not thick enough,
Increase the gum to quantum suff.,
And please yourself, or you're a muff.
P.S.—If corked too tight though it amazes,
'Twill burst and quickly go to blazes.

PRINTING TRANSPARENCIES.

Sir,—I should feel much obliged to any of your numerous readers who would inform me of the best way of taking off stereoscopic negatives, of which I have a large number, so as to exhibit them by means of a magic lantern in a clear and satisfactory manner, in order to illustrate a series of lectures on Italy, lately visited. Yours truly, A. B.

Rectory, Warrington, Lancashire.

[Some of the finest transparencies for this purpose are produced by superposition on collodio-albumen plates. Perhaps the most rapid method for a large number of subjects would be camera printing with wet collodion. A copying camera for the purpose may be easily contrived. A deal box of a length a little more than four times the focus of the lens to be used will answer the purpose. At one end must be a groove to contain the negative; at the other a groove to fit the focussing-glass and dark slide, those belonging to an ordinary camera will serve. The lens must be placed midway between the two. Pyrogallic acid acidified with citric acid will be the best developer. Care to secure delicate detail rather than density in the copies should be used. To this end a small portion of bromide in the collodion is desirable. Take care to use a collodion giving a fine textureless film; as any texture would probably show unpleasantly in the magnified image given on the screen by the magic lantern. Possibly some of our readers who are familiar with the magic lantern may be able to give you additional information on the subject.—Ed.]

The Albumen Dry Process.

Sir,—I am in the habit of using albumen, in preference to any of the processes with collodion, for negatives of all sizes, as I consider the results to be of a higher order, and the manipulation equally simple and easy.

I now follow nearly the method described in your journal by Mr, Archer,* excepting that after the last washing I place the plate for about a minute in a two-grain solution of chloride of ammonium, which adds considerably both to its sensitiveness and to its keeping qualities.

I have been much troubled of late with patches upon the plates, where the surface is rough instead of bearing the high polish that is usual wherever albumen is employed upon glass, and these patches develop vaguely, without definition, and otherwise spoil the picture. It appears as if the bath were unable to coagulate the albumen, and that some of it is dissolved from the surface, but I found upon testing my bath that it contained 48 grains of silver to the ounce, and the addition of acetic acid made no improvement. This has also occurred to me with a newly-made bath, and new albumen.

If you or any of your readers will kindly inform me of the cause of, and the remedy for this I shall be extremely obliged.

Can you not persuade Mr. Cramb of Glasgow, whose successful working in albumen you noticed lately,† to write a paper for the Photographic News, giving the details of his method of manipulating? Yours faithfully, F. Richards.

[We shall be glad to receive a hint from any of our readers who may have experimented in this direction. We have already communicated with Mr. Cramb on the subject, and have received a promise that when he determines to publish his method he will communicate with us. Possibly he can give a hint here.—Ed.]

Magic Lanterns.

Sir,—I observe from several enquiries lately in the News, that some of your amateur readers are wishful to experiment with the lime light, and I would recommend to them the part of Messrs. Horne and Thornethwaite's catalogue referring to magic and dissolving view lanterns, where they will find a very complete illustrated description of the apparatus required, method of making the gases, and management of both oxy-calcium and oxyhydrogen lights.

In reply to your enquiry of the 16th instant, I beg to state that I have succeeded in constructing, with the aid of my portrait lens (quarter plate), a very respectable magic lantern, a sketch of which I shall be glad to forward, if you think it of any service. The advantage of the portrait combination is in its great superiority of definition over the lenses usually employed for the purpose. Yours respectfully, J. W. R.

[We shall be glad to receive the sketch to which our correspondent alludes.—Ed.]

Centring of Lenses.—A paper will be read by Mr. Ackland at the next meeting of the South London Photographic Society "On some Optical Principles involved in the Manufacture of Lenses;" in which, we believe, that gentleman intends to explain the method of ascertaining the coincidence of the various lenses in a portrait combination, the discussion upon which has excited some attention.

PHOTOGRAPHIC MEETINGS IN DECEMBER.

London Photographic Society,	Tuesday, 4th.
South London, - - -	Thursday, 20th.
North London - - -	Wednesday, 26th.
Blackheath, - - - -	Monday, 17th,
Edinburgh, - - -	Tuesday, 11th.
Manchester, - - - -	Wednesday, 5th.
Birmingham - - -	Tuesday, 25th.
Chorlton - - - -	Wednesday, 12th.
Glasgow - - - -	Thursday, 6th,

To Correspondents.

L. S. B.—Acetic acid has the tendency to retard the too rapid reduction of the silver, which is effected by the proto-sulphate of iron. If the proto-salt of iron were used without acid, the probable result would be the reduction of the free nitrate of silver on the surface, before the iodide of silver in the film were reduced, and fogging would be the result. 2. Bromide of arsenic has not been sufficiently tested to determine its exact value in photography. It might injure the bath. The xantho-collodion proposed by Dr. Sanders, was intended for negatives; organic matter in collodion is undesirable for positive purposes. You can make it by adding a little turmeric to ordinary collodion. It is not kept by any one that we know of. Proto-nitrate of iron is not usually kept prepared. The solution is easily made from recipes we have already given.

J. S.—The present volume concludes with the last number in December.

Edward L.—You will find a formula at page 247, No. 109; and one of a similar character in the "Dictionary of Photography" in a recent number. We should not recommend you to use a vessel for nitrate of silver which has been used previously for hyposulphite of soda. Dilute nitric acid will be the best to wash it with. It entirely depends on the causes which have put your bath out of order. If acid with acetic acid, the addition of carbonate of soda will give you acetate of silver, and produce greater density in your negatives. If acid with nitric acid we prefer the use of oxide of silver for neutralising it.

A Young Beginner.—Your collodion has become thick and glutinous from the evaporation of the ether. The addition of alcohol would not remedy it. Add alcohol and ether mixed, or ether alone, in sufficient quantity to restore its proper fluidity. Cyanide of potassium, especially if used strong, has a tendency to weaken a negative.

X. G. A.—There is in the minds of some photographers an unaccountable objection to the use of bromides in collodion. It greatly increases sensitiveness, and aids in the production of half-tone, and also of clean pictures, especially for iron development. For negatives from one-third to half-a-grain will be generally found sufficient except, for special purposes.

Geo. Pirrie.—For instantaneous views portrait lenses are generally desirable. They can be stopped down first as much as the light will permit, or the nature of view may require. The portable camera you name is a very convenient one, the lenses accompanying it we have not tried, but have seen good pictures produced by them. The other objective you name we have not tried, but have seen good results produced by them. The Almanac is forwarded.

N.—If the plan we suggested is not effective in cleaning your gutta-percha bath, we cannot understand the cause. We will endeavour to call on the makers shortly, and make some enquiries on the subject. The collodion you name has the repute of very rapidly losing its sensitiveness. Most collodions simply iodized with potassium do so. The addition of iodide of cadmium would not now restore its sensitiveness. Probably a little bromide of cadmium would be found to improve it.

B. B.—We do not remember the London publisher of Wilson's stereograms but will enquire and reply in our next. The present address of Mr. Fry is West Kent Park, Forest Hill. Your suggestion regarding the nitrate bath shall receive attention.

H. H. B.—Your bath seems to have acquired from some source a good deal of organic matter. Excess of acid is best neutralized with oxide of silver. Try that, and if it do not succeed, try pouring it out into a shallow vessel and expose to light and warmth, so as to blacken and precipitate organic matter, and evaporate ether and alcohol, which may have accumulated in excess. Then filter and strengthen with silver. It will probably work well after this treatment, which has been successful in our hands.

An Indian Amateur.—Your suggestion shall receive attention. You will however, find much of the information you require in back volumes of the Photographic News.

H.—It is not safe to use the same dish for exciting and developing in the wax-paper process. Cleanliness in this respect is of the first importance. Use paper dishes when travelling, or make the picture itself a dish by pinching up the corners. 2. If you manipulate quickly, you may without risk excite three or four sheets before washing. 3. The silver in waste-developing solutions becomes gradually reduced, and will be found at the bottom of the vessel in which they are kept. 4. Your hypo is, doubtless, charged with silver salts, and may be recovered in the way we have repeatedly pointed out for the purpose. 5. Cyanide is best for cleaning your glass dish; you may rinse with dilute nitric acid afterwards, and then wash. 6. The iodide may still be removed from your negatives, but care must be used to prevent loosening the film.

M. A.—The gentleman to whom you refer is an optician, and "in the trade." The answer might seem more illiberal and discourteous than was intended, as it was a short unpremeditated answer to an unexpected question. On reference to another column you will see that, notwithstanding that he is in the trade, he intends to communicate his information on the subject to his photographic brethren.

E. Royns.—The focus of a lens, by which is understood the solar focus, or focus for parallel rays, is the distance from itself at which it gives a sharp image of the sun, or any object at at an infinite distance. See further, Photographic News Almanac, just out. It depends much on the subject, the light, and the quality and focus of the lens. A double combination is generally used for instantaneous purposes. Beaufoy's acetic is generally about one-third of the strength of glacial acetic acid.

H. H. C., and some other correspondents, in our next.

Advertisements and Communications for the Publisher for the current number, to be addressed to the Office, 32 Paternoster Row, not later than 3 o'clock every Thursday. Post-Office Orders are to be made payable to Mr. Thomas Piper, at the Money-Order Office, St. Martin's-le-Grand.

All Letters, Works for Review, and other Communications for the Editor, should be addressed to the Office, 32 Paternoster Row, London.

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* Vol. iv. . 24.

† Vol. v. p. 263.

THE PHOTOGRAPHIC NEWS.

Vol. IV., No. 118.—*December* 7, 1860.

EXPERIMENTS IN THE COLLODIO-ALBUMEN PROCESS.

BY JOHN RYLEY, M.D.

[The following "Results of a Series of Experiments on the Collodio-Albumen Process, as tending to show that the structural condition of the Albumen plays an important part in the Sensitiveness of the plate," was read by Dr. Ryley at the meeting of the Photographic Society on the evening of Tuesday the 4th instant.]

While making some experiments, in the spring of 1858, with a view of obtaining a dry collodion plate that would be more sensitive and uniform in its action, I was surprised to find the great difference between the sensitiveness of plates prepared with honey, gelatine, and gum, as compared with those prepared with albumen; for while the three former are nearly alike in sensitiveness, the latter will not give results equal to them under six or seven times the exposure, and the greater the care bestowed in washing away all free nitrate before the albumen is applied, the more insensitive the plate becomes; so that, contrary to all preconceived opinions, albumen (in my hands at least) has become a retarder and not an accelerator of the collodion film.

This effect I believed to be due to an altered structure of the albumen more than to chemical action. Coming to this conclusion, the thought struck me that if the plate, after being allowed to dry, was again immersed in the nitrate bath to coagulate the albumen, I should restore its sensitiveness; and so perfect was my success, that I took with a half-plate lens a negative portrait in thirty seconds, also one with a quarter-plate lens in fifteen seconds.

Having arrived at this point, another thought came across my mind, which was, that I might do away with the redip in the nitrate bath by using cadmium collodion, as the free nitrate of that metal left in the film would be sufficient to coagulate the albumen. This I tried, and so far succeeded that I took a portrait of my son in about six seconds with a quarter-plate lens.

Being anxious to test my theory to the utmost, I determined to alter the structure of the albumen by the most simple means. Therefore, after taking my plate from the nitrate bath, and washing away all free nitrate and coating it with albumen, I plunged it into a bath of hot water (just below the boiling point) for a few seconds; and so sensitive was the plate treated in this way, that I took a good negative with a stereoscopic view lens and pea stop in less than thirty seconds. In conclusion, let me state that very good results may be obtained in the following way — After washing the plate from all free nitrate and coating it with albumen, I wash off as proposed by Mr. Fothergill. and then wash with a two-grain solution of gallic acid to alter the structure of the albumen; or you may use tannic acid instead, which is more sensitive, but more liable to solarize.

SCIENTIFIC GOSSIP.

A striking reply to those who are so ready with the cry of *cui bono*, whenever allusion is made to any abstruse researches, has recently been given by some researches of Hofmann. It would be difficult to conceive any researches which have less bearing upon the requirements of everyday life than those beautifully elaborate investigations upon which this eminent chemist has been engaged for many years past—namely the composition of the *poly-ammonias*. There are probably not twenty men in England who are competent to follow with any readiness the intricate involutions and evolutions which the four organic elements C, H, N, O, with the occasional assistance of I, S, and P are made to indulge in when this great chemist has them in his retorts and pressure tubes, with the object of adding fresh members to the already numerous family of the poly-ammonias. Like all individuals of a family they are generally linked together by some likeness or resemblance, whether it be of personal appearance, disposition, or merely similarity of name. The particular branch of the great *poly* family now under consideration is characterised by the excessive length of name which the sponsors of each new arrival give to the little stranger, and likewise by the insufferably repulsive odour hanging about each individual: an odour so intolerable, that before our nasal organs were somewhat accustomed to it, we looked upon the fumes from a London cesspool as quite a relief to our nostrils. Perhaps the most interesting of all the members of this agreeable family, certainly the one which can be scented at the greatest distance off, is a substance rejoicing in the name of *triethylphosphine*, and recently a further interest has been acquired by it, owing to its marvellous facility in detecting the presence of sulphur in coal gas. We need not point out the importance of knowing when this dangerous body is in our gas. The product of its combustion, sulphurous acid, is too well known as a destructive enemy to paintings, books, binding, and though last, not of least importance to ourselves and readers, photographs, and therefore any ready test for the presence of sulphur in gas will be a boon to everyone whose interest it is to preserve intact a gallery of paintings, a library of valuable or expensively bound books, or a portfolio of photographs, as it could not fail to induce the gas companies to devote greater attention to their purifying apparatus. Sulphur exists in coal gas in the form of bisulphide of carbon, not as is generally supposed, as sulphuretted hydrogen and consequently the problem is to find a ready test for the presence of this bi-sulphide. Here our friend triethylphosphine proves of infinite use, as this body, colourless in itself, produces, when added to an almost infinitesimal trace of the equally colourless bi-sulphide of carbon, a magnificent crystalline mass of a ruby colour. This is so characteristic that it instantly occurred to Hofmann to employ the phosphorus-base as a test for the detection of bi-sulphide of carbon in coal gas. On distilling a considerable proportion of coal-gas benzole, a small portion which came over first, was mixed with triethylphosphine, when it at once solidified to a mass of the well-known ruby crystals, showing that bi-sulphide of carbon existed in large quantities in the benzole. Four or five drops of triethylphosphine were then dissolved in ether, the ethereal solution was introduced into a bulb apparatus, and a current of coal gas allowed to bubble through the solution. When the fifth of a cubic foot had passed, the liquid had assumed a distinctly red colouration, the intensity of which increased as the passage of the gas and the evaporation of the ether continued. After four-fifths of a cubic foot had passed, the whole of the ether had evaporated, and the inner surface of the bulb apparatus was lined with a beautiful network of the ruby crystals. We believe that the presence of sulphur in so small a bulk of gas was never before shown.

An improvement has recently been made in the production of black mother-of-pearl, and as photographic agency is introduced it may not be without interest to our readers if we briefly give the process. As black mother-of-pearl is not always common, a means has been sought for rendering white or yellow pearl of a beautiful black hue, which is effected in the following manner:—When the buttons, for instance, are completely finished, they are left for about twelve hours in a concentrated solution of nitrate of silver; they are then washed (after they have drained for some time) in distilled or rain water. They are afterwards covered with a solution of common salt (containing about 3 per cent. of salt), which is allowed to act upon them for one hour; after a second washing they are passed through a weak solution of nitrate of silver, obtained by the first washing, and are then exposed to the direct rays of the sun for a few hours; it now only remains to polish them. Other solutions and means of applying them have been tried, but with less success.

Some interesting researches on vegetable colouring matters have lately been concluded by M. Filhol. He has extracted the colouring matter from white flowers (or rather from so-called white flowers, for the celebrated painter Redout noticed long ago that there are no flowers of a pure white existing), and finds it to possess the following properties:—It is a clear yellow solid, soluble in water, alcohol, and ether, which furnishes very beautiful lake colours with metallic oxides, and can be used for painting and dyeing fabrics, of a bright and very durable yellow. It has been named xanthogene. The colours of red and blue flowers are found to be due to a similar proximate principle, which will be blue in flowers with a neutral juice, and red or rose-coloured in those where the juice is acid. The name of this colouring matter is cyanine, a solid uncrystallizable body, soluble in water, and capable of being applied to many uses in painting. In yellow flowers two distinct colouring substances have been found, named respectively xanthine and xantheme. Another body, named crocoxanthine, is also met with in all the species of the genus *Crocus*, it is a solid, uncrystallizable body, of a beautiful golden yellow colour, which is neither altered by acids nor alkalies; it is soluble in water and alcohol, but insoluble in ether; it produces, with some metallic oxides, beautiful lake colours; and can be fixed upon fabrics, where its tinctorial power is remarkable. Frémy has already described the beautiful colouring matter of green leaves, chlorophyll, and has stated that it consists of two distinct bodies. M. Filhol now combats that opinion, and thinks that the blue substance obtained from chlorophyll does not exist there, but is a product of the alteration of the original chlorophyll. M. Filhol comes to the conclusion that chlorophyll and xanthine are analogous, if not identical bodies. In the same memoir the author gives some valuable hints on the preservation of fresh flowers. We may preserve many flowers for a long time in a fresh state by enclosing them in a sealed tubes. At the end of some days all the oxygen of the air confined in the tube will have disappeared, and will have become replaced by carbonic acid. If we introduce into the tubes a little quicklime it removes from the flowers some of their humidity, which facilitates their preservation. Lime also takes up the carbonic acid, and the flower thus becomes placed in pure nitrogen. All flowers are not preserved alike by this process; yellow flowers are those which are altered the least. It would be easy for botanists to forward thus fresh flowers, upon which could be verified characters which it would be difficult to observe upon dried specimens. Accompanying the memoir from which the above extracts have been made, M. Filhol placed before the *Académie des Sciences* some flowers which had been thus preserved several months, the colours of which had not sensibly altered.

A NEW PHOTO-LITHOGRAPHIC PROCESS.

THIS process is the invention of Mr. G. J. W. Osborne, of Australia, and was described in a paper read before the Philosophical Institute of Melbourne, and published recently in the *Photographic Notes*. Mr. Sutton describes some specimens forwarded by Mr. Osborne with the paper as quite equal to anything he has seen produced by Colonel James's process, to which in many respects it will be seen this is analogous. We have space only for some extracts from the paper. After some introductory remarks, he proceeds to details as follows:

In the first instance a sheet of paper is prepared with albumen in the usual way known to photographers: it is, when quite dry, passed through a copper-plate or lithographic press, upon a polished steel or copper plate, by which operation it receives a very smooth and regular surface; it is then coated on the same side with a solution of gelatine, to which an addition of bi-chromate of potash has been made: this is then carefully dried in the dark and again passed through the press to ensure the finest surface. This operation completes the preparation of what I shall call the sensitive paper. Having made a negative of the original map, bearing the desired proportions to it, I place a suitable piece of the sensitive paper, just described, under and in close contact with the negative, and the whole is exposed to daylight in such a way that the luminous influence, passing through the transparent parts of the negative, shall strike directly upon the prepared surface, while the greater part of the paper is protected from its influence by the dark parts of the negative, which correspond to the white places on the original map. In the presence of the organic matter, the actinic agency effects the decomposition of the bi-chromate of potash, and the liberated nascent oxygen in all probability reacts upon the gelatine, altering its chemical characteristics in a peculiar manner. The visible effect, after removing the negative, is the formation of a picture in brown upon the clear yellow of the paper, corresponding to the transparent portions of the negative, or to the black lines upon the original drawing.

This positive photographic print is next covered with an even coating of lithographic transfer ink, by passing it through the press face downwards, upon an inked-in lithographic stone; the pressure causes the whole of the sensitive surface to lay hold of the ink, and bear away with it an even coating, hiding the brown photographic positive from view. The altered parts of the gelatine which have been exposed to the luminous action appear to be possessed of a certain amount of affinity for the grease of the ink, so that they will be found to retain it with considerable tenacity.

The next operation is to coagulate the albumen which still exists under the prepared surface; this is done by floating it upon boiling water with the paper side downwards. A subsequent soaking for a short time causes the unaltered gelatine to swell in such a way as to raise the ink with it from the paper, and a slight amount of friction, with a sponge, or other soft substance, removes the superfluous ink from all parts of the inked print which correspond to the white parts upon the original document. When the lines all appear clear and well defined, boiling water is poured over the whole, to remove the last traces of gelatine, and the print is dried. We are now possessed of a *bona-fide* lithographic transfer—that is, a drawing in greasy ink, of such a nature that it admits of being transferred to the stone in the ordinary manner, by simply inverting it thereon and passing it through the press; the albumen, which will be found to have withstood all the washing, acting as the adhesive substance under the ink to prevent the paper slipping on the stone.

The whole of these operations need not occupy more than from two to three hours.

Having given the details of his own process, Mr. Osborne offers some excellent remarks, which are well worthy the attention of experimentalists in this direction, as pointing out the conditions either to be sought or avoided.

In calling in the help of photography, the lithographer will find that there are but three obvious ways in which the agency of light can be used to aid him in producing a delineation upon a surface made sensitive to its chemical action.

1st. The exposure of such a surface in the camera.

2nd. Its exposure under a negative which has been made in the camera; or

3rd. Its exposure under a positive produced from such a negative.

Let us now examine the circumstances which attend the application of each of these three methods in photo-lithography, when the sensitive surface which is to receive the impress of light in the first instance, and afterwards to retain the greasy ink forming the picture, is spread upon the stone itself. In explanation of my reasons for making this examination, I may state that, as far as I can learn, all the efforts which have been made to produce lithographs by photographic means, have been expended directly upon the stone itself, and not, as in my own process, upon a chemically prepared transfer paper.

Firstly.—Exposure in the camera.

The exposure of the lithographic stones in the camera is a very difficult matter, owing to their varying dimensions, their weight and bulk, and the serious difficulty which the endeavour to make the surface of the stone coincide, as regards position, with that of the ground-glass side of the camera, gives rise to. As long as we adhere to this method of exposure, the cumbersome nature of the stones excludes the application of photo-lithography to the reproduction of landscapes altogether. It will also be seen that a sensitive surface being exposed in this way, must subsequently take the ink upon the parts which have not been acted upon by light; in other words, upon those parts of the stone corresponding to the unaltered portions of the said "surface."

Secondly.—Exposure under a negative.

This is the most obvious, and the most convenient means of attaining the end we have in view; but if we work with a "sensitive surface" upon the stone itself, there are several difficulties which present themselves. A negative to possess the sharpness from which good results may be obtained, must be made upon glass, either by the collodion or albumen process; such a negative is, when taken in the usual way, a "reversed negative;" this, when placed upon the stone, will give a "direct positive" photographic delineation, and a stone so prepared will give in the press "reverse positive" prints; that is, prints of a nature utterly useless, except, perhaps in the case of portraits. To overcome this difficulty, either the collodion film must be taken off the glass and turned upon the stone, or the glass with the sensitive film upon it must be turned in the camera, when making the negative, and the rays of light allowed to shine through the glass plate, striking the sensitive film on its inner surface; the inconvenience which both these alternatives occasion is very great and very apparent; they are, however, both perfectly feasible, although deficient in certain minor particulars into which I shall not enter. In using glass negatives on stone, we encounter another, and an almost insurmountable obstacle, when the stone exceeds a very moderate size; namely, the difficulty of ensuring intimate and perfect contact between all parts of the two rigid surfaces. A sensitive surface exposed in this way receives the ink upon its sunned or altered parts.

Thirdly.—Exposure under a positive.

Some of the disadvantages of the previous method of producing the photographic image which is to take the ink, are obviated by having recourse to exposure under a positive; others again, of a very serious nature, are superadded. The rigidity of the glass is avoided if we use a paper positive, but one of this kind is not nearly so positive in reference to transmitted light as we would suppose, when looking at it with reflected light; that is, the contrast is not so great between the quantity of light which passes through the black and the white parts of such a print, and is greatly inferior to contrast in the quantity of light which passes through the transparent and opaque parts of a good intense negative. Real positives can be prepared upon glass, coated with albumen, of a very intense character, but the manipulations are troublesome, and would not be adopted, save in cases of necessity. Exposure under a positive is tantamount to exposure in the camera, and the surface so treated must take the ink upon the unsunned parts.

An interesting review of the various previously proposed processes of photo-lithography follows, of which we shall probably give an abstract in a future number.

DIALOGUE SKETCHES.—No. 2. Photography to Art.

(From a "Photographer's Common-place Book."*)

> "The visual eye asks guidance from *within*,
> And as that cometh is its power increased."—Charles Swain.
>
> "Nothing is beautiful which is not good."—Plato.

Please to imagine that our friends Lovetruth and Process—riding in a certain "trap," built with an especial view to photographic purposes—are chatting about Art and Photography as they pass along a pleasant road, through a picturesque country, the day being a pleasant one in April.

Lovetruth.—Because art is no noisy declaimer, magnifying its office instead of working out its mission. The grand aim of Greek art never perhaps soared, *in intention*, beyond mere physical beauty, as expressed in symmetrical proportions and exterior forms: but who shall say that human nature was not then elevated and benefited by its contemplation or study. The sense of beauty, like the sense of right and other senses, may be distorted and degraded; but sooner or later it will assert the mission it received from the creative power of divine wisdom. To this sense there are no varieties of beauty, for all are parts of one harmonious whole; the mere material enshrining the purely spiritual as your body does your soul. When I place upon my canvas a thing it is said I never saw, in other words, a ghost, I certainly violate the real by giving it a misty form, and making it transparent in the usual conventional way; but is not the form real? have I never seen objects through a fog? or is transparency a quality peculiar only to the imagination? Beauty is the better soul of nature, but it has no existence apart from nature's body; and you must remember that every fresh conception of the imagination is but a re-arrangement of ideas which sprang into being from, and exist in, the world without.

Process.—And therefore you argue that in copying nature it is as possible to secure her spiritual aspects as her material, by the simple power of imitation. But it seems to me that even if this is the case, a power beyond that of merely selecting and imitating is required, a power of combination, which some of my profession have attempted to secure it is true, but not with that success which would justify comparison with the results of your art.

Lovetruth.—You refer to "composition printing," which is a purely mechanical method of combination, only to be judged by the amount of ingenuity and success displayed in concealing the joinings, and is no part of "composition" as understood in an artistic sense. Pictorial composition includes selection, but only in reference to certain qualities of form, colour, and chiaroscuro, and these again are subordinate to the original conception. From that beauty which the thoughtful mind discovers in the scenes of nature sprang those rules of composition, which so many imagine had no other origin than the artist's brain. Believe me, Process, beauty is so nearly allied to truth, that in securing the one you will be sure to find you have got the other.

Process.—And yet photographs are seldom beautiful, although always true. Look at our portraits, to make them please we must call in the pencil of the artist to smooth and soften, and "even up." Again, compare our landscapes with a monochrome drawing, or a fine engraving, and see how much they lose by the contrast.

Lovetruth.—Because, although not necessarily false, they are not, alas! always true. When photographic portraits were so defective, that all shadows were mere opaque patches of black, without details or gradation, and high lights were swallowed up by staring masses of white paper, it then became necessary to supply by the artist's aid, the proper gradations from light to dark, and the more delicate reflections and lights expressive of texture, roundness, &c. But your truthful photograph does all this for itself, and does it so much better, that their popularity is rapidly increasing, and only a few of the better class of photographic portraitists now supply those India-ink drawings known as "touched photographs," for which also the public demand is rapidly decreasing. As to landscape photography——

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* Continued from p. 364.

Process.—Well, that's decidedly true, and great is my quarrel with our Photographic Exhibition, which offers a premium, as it were, for the degradation of an art it was established to advance and elevate, by exhibiting, as photographs, such "India-ink drawings," executed as a rule by those who, with little or no knowledge of drawing, seldom have pretensions beyond that of patiently "stippling," or skilfully "hatching" up a degree of even smoothness which is destructive of all texture, expression and character. The introduction of colour is, I think, legitimate, it is a something really wanting; but to introduce qualities which are simply unnecessary and defective, is, to say the least, an awful display of ignorance and bad taste!

Lovetruth.—Don't be too warm, my dear fellow, we are getting nearer truth and beauty now, and "touched" portraits are doomed. But in reference to landscape photography, I was about to say, here too is a lack of truth, and consequently of beauty. The great charm of a picture, that which most powerfully affects the spectator, is the representation of space. In a fine painting, in which atmosphere is truthfully depicted, the grand and awful mystery of infinity subdues the soul with awe. Those few small feet of canvas contain a something we cannot grasp. The sight, ranging rapidly and boldly over plain and rising ground, becomes lost in the mystic blue haze of the distance, and yet seems to travel out through the horizon into the immensity of unending space beyond. Now, the inartistic photographer has overlooked this fact, sharpness and clearness have taken in his desire the place of truth and beauty. His lenses are as unlike those through which pictures are conveyed to the mind as the highest optical skill and ingenuity can make them. Aerial perspective constantly annoys him in his practice, and fain, indeed, is he to bring upon one plane, foreground, middle, and extreme distance. His demands are spurs in the sides of the opticians, they strive to oblige him by creating the lens he demands and pays for, and they are only pulled up by its impossibility. Thus it is we see and hear of "*distant*" objects in photographic landscapes being represented with the distinctness of those in the foreground, and thus it is that the eye can penetrate such a very little way into the space represented in a photograph without running against paper. Upon my word, one might almost imagine some of the landscapes had been taken in a vacuum.

Process.—But this is not true of *all* photographs.

Lovetruth.—It is though of most photographs, and even when one does sometimes get in even as far as the horizon, we are generally brought up sharp at the top of the remotest hill by a screen of white paper, miscalled a sky.

Process.—Hem! you don't like stopping out skies I know, and I begin to think you're right, Lovetruth.

Lovetruth.—I'm heartily glad to hear you say so.

Process.—But I must say I like a sharp picture, and a clear distinct distance too.

Lovetruth (*to himself.*)—Well, I suppose the error has been too much encouraged and too widely admired to be easily eradicated; but it is an error, nevertheless. How often when some inartistic friend has pointed out his conception of a beautiful view, have I found it to be a map-like extent of country seen from an eminence on a remarkably clear day. This error is certainly a popular one, and my only consolation is that photography, although now its victim, must at length prove its victor, by spreading a knowledge of true art and natural beauty among all classes of our population, and creating a new class of artists, whose works shall circulate from the palace to the cottage, whose canvasses shall be glass plates and whose brushes shall be sunbeams. (*Aloud.*) Oh! bye-the-bye, Process, when are we to begin operations?

Process.—We are close by the spot now.

Lovetruth.—Have you wet or dry plates?

Process.—Wet.

A. H. W.

Photographic Tourist.*

A FEW DAYS ON DARTMOOR.

At the little village of Sandy Park I obtained bread and cheese and cider, to which my morning's ramble enabled me to do full justice, and then set out in search of the famous Drewsteington Cromlech—one of the finest specimens in England. I first shaped my course for Stone Cross, about a mile from the village, and taking the road to the left soon reached the cromlech. It is situated in a field close to the road side, and might, without the assistance of a guide or a good map, be readily overlooked. The superincumbent mass of granite, about fifteen feet in length, is poised on three cyclopean pillars, from five to six feet in height.

The "doctors" differ in opinion as to the purpose for which these cromlechs were erected. Some consider them to have been used as sacrificial altars, whilst others incline to the idea of their being monumental relics to the memory of archdruids, or other persons of importance.

Although the light was weak, evening being not far off, and heavy clouds threatening rain, I succeeded in obtaining a tolerable negative. My dry plates were not very sensitive, so, having no fear of over-exposure, I removed the cap from the lens, and then had a look at Bradmere Pool, a few hundred yards to the north.

This tarn, covering a space of about three acres, is generally supposed to occupy the site of an ancient tin mine. Some antiquarians are of opinion that the indications of regularity and design are too apparent to admit of this supposition, and that it was either constructed for the purposes of defence, or used as a sacred grove and consecrated pool in the mystic rites of Druidism.

Returning to the cromlech I packed up my photographic apparatus, and made for Chagford, and put up at the "Three Crowns."

Chagford, directly bordering on the moor, is a very peculiar little old-fashioned town, communicating with the world once a-week, when an omnibus runs between it and Exeter. In summer it is a delightful spot, but with the slightest sign of winter it has the repute of being the most miserable place on the dreary moor. At such a time, should you happen anywhere to meet with one of the town, in answer to your question "Where do you live?" you would be certain to get the doleful answer of "Chagford, good lord!" But put that question to the same individual on a bright day in summer, and the reply will be "Chaggiford, and w'at d'ye think o't?" Indeed, I have been creditably informed, that in one notably fine season when "'tatees wos uncommon plenty," that the most polite answer to your query would be "Chagiagiford, and be d——d to 'ee."

The following morning was by no means promising, and after taking a photograph of the church, I set out across the moor on my return to Totnes; but scarcely had I reached Middleton Hill, when the rain set in steadily and heavily, and continued, without intermission, throughout the day. Photography, under such circumstances, was not to be dreamt of; and, finding that there was no chance of better promise, I decided on taking as direct a course as I could to either Buckfastleigh or Totnes. Before, however, coming to this decision, I had got on to the small inn near the Vinter Tin

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* Concluded from p. 368.

Mines, about six miles from Two-Bridges, and I found that by going a little out of my route I could visit that singular aboriginal village near Hookner Tor, called Grimspound. The wind was so boisterous, and the rain so cutting, that I found it impossible properly to investigate this interesting fortified village. A rude wall of stones, in some parts twenty feet in width, although only about six feet in height, surrounds a space of near four acres. Within this mound are numerous hut circles. Altogether, this is the most extraordinary of the relics of this class to be found on Dartmoor.

After a long and tiresome walk along the valley bordering Hamilton Downs, leaving Withycomb to the left, and passing through Buckland, I reached Totnes late in the afternoon, pretty well "done up."

It may not be out of place to give a very short statement of some of the more interesting portions of Dartmoor that would well repay a visit. Commencing with the south, we have at Ivy Bridge and South Brent railway stations, ready access to fine subjects for the camera and the pencil, and numerous specimens of the barrow, or cairn. Keeping along by the border of the moor, a few miles from South Brent, we reach Dean Coomb, where a photographer will find charming scenery for a hard day's work. From Buckfastleigh, following up the course of the Dart, we pass Hembury Castle, a British fortification, Holne Chase, Buckland Woods, and many magnificent tors overhanging the river. From Holne Chase to Dartmeet Bridge is perhaps the finest scenery on the moor, and the artist or photographer might linger a week over this part alone. Further up on the East Dart, we have two bridges, Princes Town, with the convict prison, and Wistman's Wood, with its strangely twisted oaks, which, although hundreds of years old, only average ten feet in height. On the West Dart, Post Bridge is the finest specimen of an aboriginal bridge on Dartmoor. The principal objects of interest from Withycombe to Moreton and Chagford I have already pescribed. About Gidleigh on the North Teign are numerous and highly interesting Druidical antiquities. Away to the north at Cosdon Hill, and the Vale of the Ockment, round by Lydford, are many objects of interest. Okehampton and Lydford Castles are worthy of note. The Cascade on the Lyd should not be passed by without mention. The valleys of the Tavy and Wallacombe rivers, and the numerous tors between them and Crockern Tor, near Two-Bridges, are particularly rich in Druidical and aboriginal antiquities. Altogether, it would be difficult to point out another place in all Britain so little known, and offering within such a small compass so much to charm and interest the photographic tourist.

Correspondence.

FOREIGN SCIENCE.

(*From our Special Correspondent.*)

Paris, 5th December, 1860.

One of the earliest applications of photography consisted in the reproduction of ancient manuscripts; but this application has never taken the development expected of it. By the employment of Colonel Sir Henry James's method of zinco-photography, a sphere of the greatest interest and usefulness is opened up, which we hope to see extensively utilized. There are numerous rare historical manuscripts, fac-simile copies of which would be desirable additions to public libraries in all parts of the world. These copies could be produced by the process of zinco-photography, at an almost insignificant cost.

A very curious fact has been recently brought to light, which touches the question of photography of the invisible, viz., that the effaced or faded portion of the writing of old manuscripts is restored in the photographic reproduction. Thus, the copy becomes more legible and perfect than the original. M. Vincent, one of the members of the Académie des Inscriptions et Belles Lettres, recently presented to that body the first fac-simile of a MS., reproduced photographically by M. Silvy. It was the Sforza manuscript, the original of which is in the possession of the Marquis d'Azelio. It is scarcely necessary to remark that all the designs and ornaments of this precious work are reproduced with marvellous fidelity. But the circumstance that deserves particular mention is, that certain passages which could not be deciphered in the original old parchment have actually been revived. This is particularly striking on the last page, where a note, written in German, under the signature, has not only become visible, but legible, while not the slightest trace of it can be discovered in the original. This remarkable circumstance is thus explained by M. Figuier:—On old parchments the ink, under the influence of time, assumes a yellowish tint, which often becomes undistinguishable from that of the parchment, so that it cannot be read without the greatest difficulty. But, during the photographic process, the brilliant and polished parts of the parchment reflect light much better than those where the ink has been deposited. However colourless it may appear, the ink has not lost its anti-photogenic qualities, opposed to the photographic ones of the parchment, and, thanks to this opposition, black characters may be obtained on the sensitive collodion in exchange for the much paler ones of the original.

Messrs. Deville and Debray have communicated their mode of manufacturing oxygen gas. They experimented with large quantities of the gas, obtained in succession from the following substances:—manganese, chlorate of potassa, chloride of lime, nitrate if soda, nitrate of baryta and binoxide of barium, sulphate of zinc and sulphuric acid.

These observations will be limited to the two latter substances, which are now probably for the first time applied to the extraction of oxygen. Sulphate of zinc, which is obtained in large quantities by the electricity of the galvanic pile, is a substance of which no extensive use is made at present; the elements of which it is composed can be utilized in the following manner:—In calcining it alone in a clay crucible, it is resolved into the light white oxide, when the sulphate is pure, and this oxide is used in painting; and into sulphurous acid, which is collected in the state of concentrated solution, or in that of sulphate of soda, the applications of which are now very numerous; aud, lastly, into oxygen. The complete decomposition of the sulphate of zinc does not require a much higher temperature than that for the decomposition of manganese: it has been effected in the same retorts and in the same fire. As to the separation of the sulphurous acid and the oxygen, it can be effected by means either of pure water, or of a base, by processes described in treating of the decomposition of sulphuric acid itself. Sulphuric acid concentrated at 61°C in lead answers readily for the preparation of oxygen, as at a dull red heat it is completely transformed into a mixture of water, sulphurous acid, and oxygen.

A retort of the capacity of a gallon is filled with platinum foil, or better with a spiral of platinum filled with platinum sponge, and heated to redness. By means of a siphon immersed in a vessel of sulphuric acid, a slender stream of the acid drops into the retort: the gas liberated first passes through a refrigerator, which separates the water, then into a washing apparatus of peculiar form. A constant stream of pure odourless oxygen gas is given off, and a saturated solution of sulphurous acid. If the washing water be replaced by soda-lye, we collect some bisulphate of soda, supersaturated with sulphurous acid, which may be neutralized by carbonate of soda, transformed into neutral sulphite or into hyposulphite. If we conduct the water charged with sulphurous acid into the steam generator which feeds the leaden chambers of a sulphuric-acid factory, the sulphurous acid is transformed into sulphuric acid at the expense of the oxygen of the atmosphere.

It is calculated that it will suffice to burn in the sulphur furnace of a sulphuric-acid apparatus double the sulphur contained in the concentrated sulphurous-acid solution, in order to be able to completely utilize this latter gas, so that a manufacturer can, without increasing the expense of his establishment, devote one-third of the sulphuric acid he makes to the production of oxygen. Its price, calculated on this basis, is almost nominal. In fact, it is only necessary to take into account the cost of the small quantity of coal necessary to maintain at a red heat an apparatus of small dimensions, and of the nitrate of soda serving to fix the sulphurous acid, and the oxygen from the air; for this process consists, in fact, in deriving the oxygen from the atmospheric air. But even supposing the sulphurous acid derived from the decomposition of the sulphuric acid to be lost, this acid is still better and more economical, under the same relations, than the binoxide of manganese.

To the numerous methods already proposed for detecting the presence of wool or cotton in a silk fabric, Professor Stefanelli adds the following:—Supposing the fabric to consist of silk, wool, and cotton, it is immersed in a test-solution consisting of caustic ammonia and hydrate of copper; in a short time the silk and cotton are dissolved, but the wool remaining insoluble is precipitated. On diluting the liquor with water, then treating it with nitric acid until its deep blue colour disappears, little white, or slightly coloured flocks make their appearance, they consist of cellulose more or less modified, and indicate the presence of cotton. It is necessary to remark that fabrics of black silk, even when they contain no admixture of foreign fibre, leave sometimes a bulky residue, but it is easy to distinguish it from that left by wool, for, unlike to the latter, it is completely soluble in nitric acid. Professor Stefanelli's process, however, does not appear to possess any superiority over that proposed by M. Peltier, fils, in fact, the latter has some advantage over the former in being more facile and rapid. Briefly stated, M. Peltier's process is as follows:—Immerse the fabric to be tested in a cold mixture of monohydrated nitric acid, and sulphuric acid of 66° Beaumé, then carefully wash it in water. Upon examination, the threads of silk will be found dissolved, the woollen threads will be found turned yellow, or deep brown, and the linen and cotton threads remain white; when these threads are dried, if placed in contact with flame, the linen and cotton threads being converted into pyroxyline, burn with explosion, while the woollen threads are carbonized, and emit the well known odour of burnt horn or wool.

When ordinary glucose is treated with stearic acid at 250° F., after the action has continued forty or fifty hours, we observe the formation of *stearic glucose*, to which M. Berthelot assigns the formula $C^{54} H^{78} O^{14}$. We obtain the same result when cane-sugar or trelahose is substituted for ordinary glucose. Stearic glucose is a neutral, colourless, solid substance, of a waxy consistency, resembling stearine in appearance. It is very soluble in ether and in absolute alcohol, but insoluble in water. When it is shaken up in this last menstruum, it yields an opalescent mixture like a weak emulsion. Analysis of stearic glucose, prepared with cane-sugar, gave the following proportions:—

Carbon	72·4
Hydrogen	11·0
Oxygen	16·6
	100·0

The formula $C^{54} H^{78} O^{14}$ requires:—

Carbon	72·6
Hydrogen	11·2
Oxygen	16·2
	100·0

Stearic glucose reduces cupropotassic tartrate, and becomes strongly coloured in contact with concentrated sulphuric acid. Heated with a mixture of hydrochloric acid and alcohol, it is decomposed into stearic ether, fermentiscible glucose and humoidal matters. When in the preceding operation the stearic acid is replaced by butyric acid, we obtain *butyric glucose*. This is a neutral, oleaginous, yellow liquid, soluble in ether and aqueous alcohol, and slightly soluble in water. Its analysis gives:—

Carbon	55·7
Hydrogen	7·5
Oxygen	36·8
	100·0

The formula $C^{28} H^{22} O^{14}$ requires:—

Carbon	55·6
Hydrogen	7·3
Oxygen	37·1
	100·0

Submitted to the action of heat, *butyric glucose* is decomposed, and consumes without leaving any ashes. It reduces the cupropotassic tartrate, and becomes coloured when mixed with sulphuric acid. Treated with warm dilute sulphuric acid, it is resolved into butyric acid and fermentiscible glucose, at the same time a little ulmic matter is produced.

Dextrine, heated to 212° F., with butyric acid, yields a small quantity of a neutral compound, analogous or identical with butyric glucose. *Cotton* and *paper* treated with a mixture of butyric and sulphuric acids, yield traces of a compound of the same kind. Similar results ensue when sugar of milk is heated to 212° with butyric acid, the compound formed under these latter conditions cannot be identical, but at most isomeric, with ordinary butyric glucose. Many analagous compounds might be described, such as *acetic glucose*, *benzoic glucose*, but their nature is sufficiently indicated by those already mentioned. M. Berthelot's researches on this class of bodies possess much interest.

The use of albumen of eggs in dyeing, entails such a heavy expense, that it has become a great desideratum to replace this substance by others less costly. M. Leuchet has found a substitute in the albumen of blood, and in the roe of fishes. To extract the albumen from blood, the latter is collected, immediately the animal is killed, in a flat-bottomed vessel furnished with taps, at different heights, in its sides, care being taken to dsturb the blood as little as possible. After the expiration of ten or fifteen hours the serum is separated from the clot by decantation, and exposed to the air for six to ten hours. A deposit is formed, which, also, is separated by decantation; the liquid is next placed in a room heated to 104°; a solution of sugar is then added to that portion of the serum which is coloured red, exposed to the air a sufficient length of time, then decanted. It is then mixed with a concentrated portion of fish-glue, and gently stirred, and left to clarify for a day or two. At the expiration of this time all the colouring matter is separated and the clear liquid may be decanted and concentrated. The albumen of blood, thus prepared, has all the properties of albumen obtained from eggs.

The preparation of albumen from the roe of fish can be effected,—1st, From the dried roe, as found in commerce; 2nd, From the roe of the fish as soon as caught; and 3rd, From salted roes, or from the roes of salted fish. When dried roes are employed, they are coarsely ground, and the mass dissolved in water; the water is then decanted, and the residue dried at a temperature of 140° F. It is better to operate upon fresh roes, as the preparation of the albumen is more advantageous, for the expense of drying, salting, and carriage is thereby saved. We commence by washing the roes, and pressing them, and, after decanting the water, dry the mass in a stove. The same process is followed with salted roes, except that we first wash them to remove the salt. The small quantity of fatty matter the roes contain is in no way injurious in their application to dyeing, but, on the contrary, it gives more brilliancy to the colouring material.

Some experiments recently made with a new method of treating zinc ores, have solved the problem of reducing these ores in blast furnaces, similar to those employed for making cast iron: the result will be a complete revolution in zinc manufacture. I must reserve further details for my next.

Proceedings of Societies.

London Photographic Society.

The usual meeting was held on the evening of Tuesday, the 4th inst. Peter Le Neve Foster, Esq., M.A., occupied the chair.

A specimen of Mr. Robinson's large composition photograph, the "Holiday in the Woods," was exhibited and much admired. Some stereograms of scenery in New South Wales were also exhibited, which had been forwarded by Mr. Hetzer, of Sydney.

The Secretary, having read the minutes of last meeting, the Chairman asked if it were the pleasure of the members that these minutes should be confirmed, when

Mr. Watson rose and said he objected to these minutes being confirmed, as they were not a perfect or correct statement of what took place at the last meeting. They stated that the paper of Mr. Rothwell was read at the last meeting, whereas a portion only was read, and that so small that—

The Chairman interposed that the speaker was in error. The minutes only stated that a portion was read.

The minutes were then confirmed and signed.

The Chairman said that, in compliance with the seventh rule, he should now read the names of their retiring officers and those proposed for re-election. If any member had any others to propose, a list must be given in at the meeting in January. The officers who would retire were—Mr. Roger Fenton, one of the vice-presidents; and Messrs. Hardwich, Mackinlay, Pollock, Marshall, Wenham, and Professor Bell. Those proposed for election or re-election were—Professor Bell, for Vice-President; and Messrs. T. R. Williams, Roger Fenton, Warren De la Rue, Walter Hawkins, the Rev. J. B. Major, and the Earl of Caithness.

Mr. Watson again rose and said, that it was stated in the Journal of the society, that Mr. Rothwell's paper was *read* and discussed at the last meeting. From the imperfect way in which it was then brought before the members, it could scarcely be said to have been discussed. On reading it in its entirety he found that there were many objections which could easily have been answered; but—

The Chairman must really interrupt the member, who was quite irregular. They could not reopen the discussions of last meeting at the present. They had already a definite subject before them. If the member desired to make any objections to the proceedings at the meeting in question, he must give notice, and do it at a proper time.

Dr. Ryley then proceeded to read the results of his experiments, tending to show that the structural condition of the albumen plays an important part in the sensitiveness of the plate in those processes to which it is applied. (See p. 373).

Several specimens were handed round to illustrate the results of the various experiments.

Dr. Ryley said, that whilst the specimens were examined there was another experiment he might mention which bore on the subject. It had occurred to him that the increased sensitiveness to which he had referred might be due to the coagulation of the albumen allowing the developer to penetrate more freely, and thus produce more rapid results. To prove this he took a plate, and after exciting it, washed thoroughly, coated with albumen, and allowed it to dry. He then exposed it, and before developement redipped it so as to coagulate the albumen after exposure. On attempting to develope, it was quite a failure. He thought this showed that the coagulation actually increased the sensitiveness of the film to light. He was not anxious to have it proved that the increase in sensitiveness was due to an altered structural condition of the albumen, although that was his own conviction; but he was anxious that the subject should be thoroughly discussed, and the question set at rest as to whether the increased sensitiveness was due to chemical or structural conditions.

Mr. Hardwich remarked, that the specimens were not labelled to show the respective methods by which the coagulation had been produced.

Dr. Ryley said most of them were coagulated with gallic acid. One was produced by redipping in the nitrate bath; it gave the best results, but would only keep three days; whilst those coagulated on the gallic or tannic acid would keep any length of time. If metallic iodides were used, coagulation, was effected, and a great increase in sensitiveness obtained; but the film blistered so much as to render their use undesirable.

Mr. Hardwich said that anything he might say would be quite on the spur of the moment, as he had not anticipated making any remarks. His experience quite confirmed that of Dr. Ryley as to the respective degrees of sensitiveness arising from different preservatives; he thought they would be found to stand in something like the following order, gum, the most sensitive; gelatine, the next; and albumen the least. The question was, however, in regard to the latter, as to the causes of its increased sensitiveness after coagulation; was it due to structural or chemical changes. His own experience was, that it was necessary to coagulate by redipping in a nitrate of silver bath, in order to secure the maximum of sensitiveness and intensity. He thought it was important to include both qualities in the consideration. In using a lens of long focus and taking a subject badly illuminated, it was often difficult to get sufficient intensity—or he would prefer to use the word contrast, as better expressing the idea—even when the desired sensitiveness might exist. To obtain the maximum amount of contrast under these circumstances, he found it best to coagulate with nitrate of silver. With any other method he found a want of intensity and general feebleness in the negatives. Other methods of coagulating might do when using a stereo lens and in a bright light. The effect that he had observed when using gallic acid was that it increased the intensity, but not the sensitiveness, and it also diminished the tendency to solarization; and he thought that the results produced by it, which had been attributed to coagulation were really due to its operation as a reducing agent. He rembered an experiment he made with a Taupenot plate, he washed one half with salt and water and the other half with distilled water. He found after exposure that the half washed with distilled water developed much more rapidly. On continuing the development, he got as much detail with the salt and water washing as with the other; but there was this difference, the salt had the effect of diminishing the contrast; the sky was not so opaque. It diminished the intensity but not the sensitiveness. A second plate which was washed with salt and water, was afterwards dipped in gallic acid, which after developing, possessed full intensity; the gallic acid seemed to have restored the intensity which salt and water had taken away. All the free nitrate of silver being removed from a plate, had a tendency to lessen intensity, and the use of a reducing agent like gallic acid restored it again. He was therefore rather at issue with Dr. Ryley as to the operation of the gallic acid; he thought that was due to chemical action which Dr. Ryley attributed to altered structure. These views were borne out by his experiments in Petschler and Mann's process, the negatives produced by which were inferior in point of contrast to those produced the Taupenot process proper.

Mr. Sebastian Davis said it might be interesting at the present stage of the proceedings to detail the results of some experiments in this direction. The first experiment to which he would call attention consisted in washing away the whole of the free nitrate of silver from the excited collodion film, covering with a mixture of albumen and water in equal proportions, and then coagulating the film at a temperature of 180° Fah. in a hot air bath. Now it appeared to him that if the only use of the nitrate of silver bath were to coagulate the albumen, that the plate should, in this condition, be equal in sensibility to an ordinary Taupenot one. It would be found, however, that even after a long exposure and a prolonged attempt at development, little or no trace of a picture will be perceptible. If a second plate, prepared as before, with the exception of coagulating the albumen by an immersion in boiling water instead of by dry heat, the sensibility was greatly increased and a satisfactory picture could be taken with only double the exposure required for a collodio-albumen plate excited in a second nitrate of silver bath. From this he inferred that the removal of the soluble salts from the albumen by washing, was as necessary to promote sensibility as the coagulation of the film by heat, gallic acid, or metallic salts. The next experiments to which he would refer were made upon plates washed in distilled water after removal from the nitrate of silver bath, but covered with a mixture of dilute albumen containing two or three grains of chloride of sodium to each fluid ounce; he exposed a plate after having coagulated the albumen in an air bath, at 180° Fah. to diffused daylight under a negative, but could obtain, as first noticed by Mr. Petschler, no trace of a picture. He then manipulated upon two others, prepared as the last, with the exception of being thoroughly washed in many changes of water after heating, and, upon exposure and development, found them to possess nearly if not quite an equal sensibility with ordinary Taupenot plates. There appeared, however, to be some contradictory results with reference to the amount of sensibility possessed by the Petschler plates before the final washing. He thought that a difference might arise from the employment of common or distillated water, for the first washing. In one instance the whole of the silver salts were removed except those depending upon the composition of the collodion; in the other, he produced and fixed in the film a considerable quantity of chloride of silver. If he might venture to speak from a single experiment, it appeared to him not altogether immaterial to the result, whether the chloride of sodium or ammonium be mixed with the albumen. He thought it might be found that chloride of sodium has a greater effect in arresting action of the light, then an equivalent weight of the chloride of ammonium. However this might be, he could not but remark that the subject of collodio-albumen processes was of especial interest, inasmuch as there were no other known chemical compound that has the same photographic properties as albumen. It was capable of being applied to the collodion surface in a state of solution; it was coagulable and rendered thereby insoluble by heat, nitrate of silver, and metallic salts; and, furthermore, it fixed the sensitive film with great tenacity to a polished glass.

Dr. Ryley thought Mr. Hardwich's arguments had not answered the fact, that a plate in which every care had been used to wash away the free nitrate of silver, coated with albumen and then plunged into hot water for two or three minutes, produced a similar sensitive result, giving a picture in six or seven seconds, and was intense as well as sensitive. The same result could be produced with sulphate of iron, acetic acid, or alcohol. He thought that these facts all indicated that it was simply the coagulation of the albumen which produced the result.

Mr. Hardwich said in regard to hot water he thought possibly it might act by removing the soluble chlorides and phosphates from the albumen, thus removing those things which would diminish the sensitiveness of the film. He again laid stress on the question of intensity. They could not get the same amount of contrast by means of hot water as by means of redipping in the nitrate of silver.

The Chairman asked how long the plates prepared with hot water would keep.

Dr. Ryley had not tried: but those redipped in the nitrate bath would not keep more than two or three days.

Mr. S. Davis asked if Dr. Ryley had tried the application of dry heat.

Dr. Ryley had not found it answer.

A vote of thanks was then passed to Dr. Ryley for his paper.

The Chairman called attention to an instantaneous negative taken on a Taupenot plate, by Mr. Samuel Fry.

Mr. Thomas then read a paper entitled "How to Varnish the Negative," which, with the discussion thereon, will appear in our next.

The following new members were ballotted for and elected in the course of the evening: Messrs. E. L. Lloyd, G. Wharton Simpson, H. S. Gray, and W. Rowles.

Photographic Society of Scotland.

The first meeting of this society for the season was held on the evening of Tuesday, the 13th ult., in George Street Hall, Edinburgh. Mr. Sheriff Moir presided.

After the usual routine business and the examination of specimens sent by M. Joubert and others,

The Chairman said it had been suggested to the council that the particular time of the year at which the exhibition of the society was usually open was not the best; and accordingly this year the time of opening the exhibition would be postponed from Christmas till February. Some might think this alteration would bring it into competition with other exhibitions of paintings then open; but this, instead of being a drawback, would, in his opinion, be a positive advantage, as those who visited the one would most likely not be satisfied without visiting the other. It was a matter of regret that on the present occasion there was no paper to be read; and he urged on members to write papers for future meetings.

Skaife's patent shutter for instantaneous exposures was shown by Mr. L'Amy. It contained a pair of folding doors, like the shutters of Daguerre's original camera, with an india-rubber spring so arranged that, when opened, it closed with great rapidity. The same gentleman also exhibited a species of turning lathe he had invented for cleaning glass plates. A camera was exhibited, manufactured by Mr. Bryson, of brass, with a slide made of a preparation of india-rubber, which was not affected by acids. Woodward's solar camera, with some specimens, and Melhuish's metal stereo-camera and lenses were also shown.

Mr. Taylor, referring to Mr. Kinnear's retirement from the secretaryship of the society, moved that the silver medal of the society be presented to Mr. Kinnear, as a small recognition of his services.

The resolution was passed unanimously, and the proceedings terminated.

Chorlton Photographic Association.

The meeting of this society was held on Wednesday, the 14th of November, at the Chorlton Town Hall, Mr. W. Griffiths presided.

The minutes of the last meeting having been read and confirmed,

A conversation arose on some objections which Mr. Hardwich had made, to a recent speech of Mr. Griffiths at a meeting of the society, referring to the unsatisfactory state of the present knowledge regarding the chemistry of photography, more especially referring to collodion. Mr. Griffiths had stated his conviction that recent research had not thrown additional light on the subject, a statement by which Mr. Hardwich had felt himself aggrieved.

Mr. Wardley, who introduced the subject, stated that for his own part he doubted whether they knew any more of the various chemical changes which took place in photography than they did when the collodion process was first discovered. A general impression prevailed that Mr. Hardwich's objection was scarcely necessary.

Mr. Griffiths then read a paper "On the Preparation of Iodo-Nitrate of Silver: its Chemical and Photographic Properties." All the processes that we were accustomed to work, he remarked, and in which iodide of silver formed the sensitive medium, with the exception of the daguerreotype, were dependent mainly upon the presence, in minute quantity, of this salt for their sensibility under actinic influence, and not, as was generally supposed, to the presence of free nitrate of silver. In support of these views he described in detail several experiments he had performed: one in which he had prepared several collodion plates in the usual manner, but on taking them from the silver bath they were deprived of every trace of free nitrate and dried. In this condition the film of collodion was ascertained by an appropriate test to contain both iodide and iodo-nitrate of silver; upon exposure these plates had invariably been found equal, if not superior, in sensitiveness to others prepared from the same collodion, exposed wet, and with excess of free nitrate. He believed that a more extended investigation into the properties of this salt would have the effect of satisfactorily clearing up many of the difficulties connected with the working of the dry processes. Referring to the retarding effect, as respects sensitiveness, produced by adding iodine to collodion, he did not think the generally received opinion, that this was owing entirely to the liberation of free nitric acid in the bath, was quite correct, for the quantity set free by using a collodion, containing even as much as one grain to the ounce, would be so exceedingly small as to make it very doubtful whether this ought to be accepted as a true explanation. From the result of some experiments he had made he believed it to be owing more to the formation of iodic acid, which might occur in the following manner:—For every six atoms of iodine in collodion, five atoms of iodide of silver, one atom of iodic acid, and five atoms of nitric acid resulted upon dipping the plate in the bath of nitrate of silver. The nitric acid, from its powerful affinity for water, was quickly disseminated through the bath, and in consequence its influence was diminished; but the iodic acid remained partially imprisoned in the film with the iodide of silver. They were all aware of the retarding effect produced by free nitric acid in the bath, but according to his experience this was slight as compared with that exercised by iodic acid under the same circumstances. On some future occasion he hoped to have an opportunity of explaining to them what he believed to be the *rationale* of the effect produced by free acids in the bath in diminishing sensitiveness.

After some discussion on this and minor subjects the proceedings terminated.

Apparatus.

STEREO MANIPULATING CHAMBER.

The special object of the Stereo Manipulating Chamber, the invention of Mr. Sebastian Davis, is to enable the tourist to produce stereograms by the wet collodion process without the incumbrance of heavy or inconvenient apparatus. This invention essentially consists of a portable and commodious folding chamber, and a light, cone-shaped camera, with rising front to carry the lenses.

The chamber is capable of carrying the camera when packed in its interior, and has an aperture in front equal to the size of a stereoscopic plate, over which the cone slides when ready for use. Upon the internal side of this opening, a frame is fixed, having silver rests for supporting the sensitive glass, and a shutter is hinged to the back to enclose it in darkness. Immediately beneath the frame is a longitudinal stop, glazed with yellow glass, and fitted with slides, in order to regulate the admission of light. Beneath this, and through the bottom of the box, a cloth bag is suspended to hold the nitrate of silver bath; over which a lid shuts for the purpose of excluding dust, light, or chance impurities. Upon the edges of the top and bottom of the box are hinged two flaps, each half the height of the box, the upper one supports the black covering free from the hand, and the latter constitutes the table for the developing tray, and the two, when closed, protect the contents.

The developing dish is made of tin, and holds over its centre a piece of wood, which retains the damp glass without slipping when at a considerable inclination. By this arrangement the plate can be developed with out fingering, until it be thought necessary to examine it by the transmitted light admitted through the opening immediately facing the operator. At the right hand side the box has an arrangement for holding three glasses to contain the developing fluid, water and the fixing solution. The stereo manipulating camera is fastened in the usual manner to the top of the ordinary stand, and its elevation can be regulated to the height and convenience of the photographer. A curtain which is attached to the box, answers the purpose of the focussing cloth, the completion of a light-tight chamber when secured round the waist, and an outside wrapper to cover the whole when closed.

The camera is accompanied by a novel plate-box which has been designed as a convenient arrangement for carrying wet plates without the risk of displacing the film. The box is made internally equal to the length of the plate, but about three eighths of an inch wider. Upon the longer sides four pieces of wood are to be attached, a quarter of an inch distant from the ends; these pieces serve to retain a series of loose slips having raised corners against the shorter sides of the box. By placing the wet plate face downwards, upon a pair of these slips, it will be kept steadily in its place, and will rest simply upon its four corners; additional slips and plates can then be arranged alternately in like manner, and a number of positives can thus be carried with complete security, and without the chance of the wet film being displaced by friction.

LEAKE'S DARK TENT.

This tent comprizes lightness, portability, simplicity, and cheapness combined with efficiency, in a greater degree than most that we have seen. It consists primarily of a shallow box or tray, about twenty-two inches long, twelve wide, and two deep, the lid forming the top of the tent. Round three sides of this tray is secured the lining, of black and yellow calico, and a curtain of the same material wraps round the operator, and excludes light. The top is supported by two light iron rods, which are of sufficient length to keep the covering in a state of tension, thus insuring perfect rigidity. An aperture in front admits of sufficient light for convenient working, and a gutta-percha tray, with a flexible tube attached carries off the waste water. The whole is attached to tripod a stand, of a height to suit the operator. When not in use the covering folds into the box, which may be conveniently carried by the handle attached to the side. The weight of this tent, complete, is about five pounds.

The first mentioned of these contrivances for field operations is not, that we are aware of, made for sale; but the latter is manufactured at a price less than a home-made one would cost by H. Squire and Co.

Photographic Notes and Queries.

THE ALBUMEN PROCESS—VARNISH CRACKING.

Stubbers, Romford, 4th December, 1860.

Sir,—The rough places complained of by your correspondent, F. Rickards, are probably caused by the adhesion of insoluble salts of silver, from placing the plate in hard water, or salt and water, before the nitrate is sufficiently removed. A film of albumen or collodion will always be marked in this way if placed in water, which precipitates nitrate of silver strongly, while it contains much nitrate. The way to avoid this cause of failure, is to wash the film well in distilled water, or clean rain water, before putting it in hard water.

Some time ago I saw in your journal complaints of varnish cracking on negatives. This annoyance is, I believe, generally caused by varnishing the plate when the film is not perfectly dry; it oftener occurs with amber varnish than spirit varnish, because the former is used on a cold plate, while the warming necessary for the latter generally dries the film. When amber varnish is used the plate should be well heated to ensure perfect dryness, and varnished as soon as cold.—I am, sir, your obedient servant, T. Russell.

COPYING CAMERA.

Sir,—I am about constructing a camera for copying and enlarging small negatives; but before I begin I would wish for information on the following points, which perhaps you will kindly give me, or say where I may find it:—

1st. What is the best lens for the purpose? I have a $\frac{1}{2}$ double portrait, $\frac{1}{4}$ ditto, a stereoscopic view lens, and also some plain single lenses, non-achromatic double convex, planoconvex, and meniscus; now which of all these is best suited for my purpose?

2nd. What proportion should the *total* length of the copying camera bear to the focal distance of the lens used?

3rd. How is the focal distance of a double combination portrait lens ascertained?

4th. In using the lens how should it be turned in the box, that is, which surface should be next the negative to be copied?

Perhaps you will kindly say something in reply to these queries in the next number of the Photographic News.

N.B.—By focal distance, I mean *principal* focal distance, as all the other conjugate foci differ.—I remain, dear sir, yours very truly, M. M. D.

[1. Enlarged copies may be produced by either a view or portrait lens, and we have seen excellent results produced by both. We use a portrait lens stopped down. Your non-achromatic lenses are unsuitable.

2. The total length of your copying camera must entirely depend on the amount of enlargement you require, and the focus of your lens. If you wish to enlarge a quarter-plate picture, so as to fill a whole sheet of paper (22×17) with a lens of 10 inches focus, your camera should extend sixty inches.

3. To ascertain accurately the equivalent focus of a compound or portrait lens, divide the known focal length of a *single* lens (say a spectacle eye) by the fraction, representing the linear dimensions of a distant object, formed by the simple and compound lenses. Thus:—Let the focal length of single lens = 12 inches, and the images formed by it and the combination be as 3 to 2 in linear measurement; then $12 \div \frac{3}{2} = 8$ inches = the equivalent focal length of the combination required.

4. In enlarging reverse the position of the lens so that the front of the lens faces the sensitive plate instead of the object to be copied.

You will find a good deal of the information you require more fully explained in a chapter on the subject in the Photographic News Almanac, just published.—Ed.]

THE DRY ALBUMEN PROCESS.

Glasgow, December 5th, 1860.

Sir,—In compliance with your request I will now try to give the "hint" required by Mr. F. Richards in last number of the News.* It is often difficult to state with certainty what is the cure for a disease, even if we have the opportunity of making our own diagnosis, but the difficulty is much increased if we can only have the description of it from another whose habit of observation may be different, or whose phraseology it may not be easy to value exactly.

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* Page 372.

If I understand my co-operator rightly, his difficulty is easily got over. It *does* arise from the silver bath being too weak to form the bright transparent coagulation of the albumen, and the reason this appears in patches is that the film is unequal; adding more acetic acid to the bath would not mend but aggravate the evil. The amount of iodide in the albumen, and the thickness of the coating in the glass determines the strength of the silver bath required. If a frosted effect shows, more silver must be added, or less acetic acid used; I may say I don't have much faith in some so-called silver meters, articles which only measure the specific gravity of a liquid, can be of no use in determining whether a bath contains nitrate of *potash* or nitrate of *silver*.

I have much pleasure in subscribing to the opinion expressed by your correspondent regarding the superiority of the pure albumen over any dry process I have tried or seen tried. I believe it to be the rapidest, and it is undoubtedly the most certain, and what could be easier? Yours truly,

John Cramb.

New Negative Developer,—The Improved Albumen Process

Sir,—I beg to inform Herr Liesegang that the developer communicated by Herr Cozics, (p. 369) so far from being new, has for many years been known and practised in England. The original formula is as follows:—

Protosulphate of Iron, ... 12 grains,
Acetate of Lead, ... 12 grains,

Dissolve each in half an ounce of water, and add to the acetate of lead solution 1½ drachm Beaufoy's Acetic Acid (or 30 minims Glacial acetic acid) then mix with the iron solution, stirring with a glass rod. A precipitate will fall, and the clear liquid, when filtered, is fit for use. I copy this from an entry in my common-place book, made at least three years ago.

With reference to the communication of Mr. Richards (p. 372) on the Albumen Process, as improved by Whipple, Coale and Archer, I think he must have overlooked Mr. Archer's letter p. 228 of the present volume, *ante*, pp. 155, 190, and from which he will perceive that Mr. Archer *does* convert the free nitrate into chloride of silver, and thereby obtains an impression with one third the usual time of exposure. As the usual iron developer did not answer Mr. Archer's expectations, perhaps he will find the above mentioned one to be preferable, though it cannot be better than gallic acid and acetate of lead.

I regret I am unable to suggest a remedy for the rough insensitive patches on Mr. Richards's plates. He does not say if they are apparent, as one would expect, on removal of the plate from the sensitizing bath. I therefore infer that they do not appear till development. Does he beat up the *whole* of the albumen to a stiff froth, and leave it to settle three or four days at least before use? Are his plates thoroughly well cleaned and made hot before a fire previously to coating? Have the plates been kept free from damp after preparation? I find Mr. Archer is frequently annoyed with blisters in this process. These may be prevented by attending to the points I have drawn attention to, and if the sensitizing has been deferred till some time after coating, by baking the plates again before putting them into the aceto-nitrate bath. Giving them a previous coating of dilute albumen, though troublesome, is as advantageous in this as in all other dry processes, and probably the final dipping of the plates, after preparation, but before the final drying, in a bath of hot water, may be found beneficial.

I do not think Mr. Cramb, who works by the old albumen process, has any thing new to communicate beyond what is known to those who pursue the method now under discussion. When he publishes his mode of manipulating, we shall see. Yours truly, An Amateur.

PHOTOGRAPHY AT SOUTH KENSINGTON MUSEUM.*

John Scott, Esq.; examination continued.

"977. How are Mr. Cole and Mr. Thurston Thompson connected?—Mr. Thurston Thompson is not only photographer to the South Kensington Museum, but he is also bound to Mr. Cole by ties of relationship. I believe Mr. Thurston Thompson and Mr. Cole are brothers in law, as I have always understood, and Mr. Cole would naturally feel interested in what his own relative does, apart from his being photographer to the Department.

"978. You stated that at one time Sir Benjamin Hall, at the head of the Board of Works, did give permission for the cartoons to be copied by you?—He wrote a letter to Mr. Willshire, in which he desired him to lower the cartoons for Signor Caldesi.

"979. Can you state whether that letter is in existence?—Most decidedly; my impression is, that it would be at the Board of Works, or in the possession of Mr. Willshire.

"980. I understood you to say that that letter was not looked upon by Mr. Willshire as an official letter; can that letter be traced anywhere?—I should leave Mr. Austin to answer that.

"981. With reference to what you stated with regard to the Government, am I right in believing that till now you were not aware that the Board of Works and the Department of Science and Art were one and the same thing as regards this question of the cartoons at Hampton Court?—I am not aware that they are now. I always understood that the Department of Science and Art was amenable to the the orders of the Board of Works.

"982. You have given your evidence entirely upon that supposition?—Most decidedly.

"983. Up to the present time you have not heard anything to give you a contrary impression to that, namely, that the Department of Science and Art, in reference to Hampton Court, was in fact under the superintendence of the First Commissioner of the Board of Works?—Just so; I know that the First Commissioner of Public Works gave our permission, which was afterwards recognised by his successor.

"984. When that permission was originally given by Sir Benjamin Hall, and afterwards recognised by his successor, did he give that permission as acting for the Department of Science and Art?—Here is the letter of the Department: 'With reference to your letter of the 23rd of March last, and to this Board's reply of the following day. I am directed by the First Commissioner of Her Majesty's Works, &c., to acquaint you, that arrangements have been at length completed for affording the greatest possible facility and security in taking photographs of the cartoons of Raffaelle in Hampton Court Palace. These arrangements have been made by the Science and Art Department, and approved of by this Board.' That led me of course to suppose that the one was superior to the other, and that the Department of Science and Art was acting under their direction, and that permission had been given to the officer of that Department to take photographs of the cartoons for the use of the schools of art.

"984*. You consider that you had reason to believe by that letter, that the whole question of the taking of those copies of the cartoons rested in fact with the Board of Works?—Yes.

"985. Because by that letter they appear to have given permission to the South Kensington Museum to take down the cartoons for the purpose of having them copied for the use of the schools?—Yes.

"986. Were you led to believe by that letter that those copies would be only distributed to the schools?—Yes, and as far as they might be useful to Mr. Thurston Thompson also, because Mr. Thurston Thompson had always hitherto sold what had been produced for the schools, and I had reason to believe that he would issue them against us.

"987. Now, your complaint is, that not only were those copies distributed for the use of the schools, but that they were generally brought into competition with the trade of the country?—I could not object as an individual to those things being done for the schools.

"988. My question is this, you do not complain of those copies being made use of for the purposes of those schools, that is for the education of the country?—No.

"989. Do I understand you rightly or not to say that you object to those copies going beyond that, and coming into competition with the general trade of the country?—Yes, I do object to that, not as an individual, but the question relates to the interest of a large profession; I object to your word 'competition,' because it is not competition, it is something beyond that.

"990. What I mean by competition, is underselling?—Yes, a Government department trying to undersell a profession is a monstrous idea.

"991. Are you aware that, during the time that Sir Benjamin Hall was Chief Commissioner of Works, he altogether refused to have anything to do with the question of the Science and Art Department at Kensington Gore?—I am not in the least aware of it.

"992. Mr. *Joseph Locke.*] Are you aware of any other persons besides the officers of Department of Science and Art, having made copies of works of art in Paris about the time of the Paris Exhibition?—I am not aware of that.

"993. In answer to a question from the Chairman, No. 350, Mr. Cole stated that, 'During the Paris Exhibition, the Emperor of the French was good enough to allow the British authorities there to have practically almost unlimited access to the collections of the Louvre;' and he says further, 'By the good nature of the Emperor of the French, we were allowed to photograph and colour those objects, so that we are enabled to give our people the benefit of them at a comparatively insignificant rate;' I wish to know from you whether the trade had equal facilities, or any facilities for copying works of art in France at that time?—I should say not.

"994. Are you aware whether anyone, since that period, has had facilities afforded him of copying works of art in Paris?—No, my attention has never been directed to the question.

"995. Have you never seen any copies of any works of art in the museums in Paris done by any one except the Department of Science and Art?—It is impossible for me to notice and remember everything which is brought into our house for sale; it may have been done. I know that we have had copies sent to us of objects in French collections.

"996. Have you any reason to doubt that there is a trade in most of those works in Paris?—Judging by the extremely narrow way in which everything relating to art in France is dealt with by the Government, I should be inclined to think that nobody would have access to anything in Paris unless he were backed by the Government. I should think that it would be all left to the Imperial Government, I do not know what the regulations are; there may be a jobber there in every department to monopolise everything for what I know.

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* Continued from p. 359..

"997. With regard to access to public institutions here, your opinion is, that to persons like yourself, or any respectable house, that permission ought not to be refused?—I could offer no opinion about the Queen's pictures, except that our humble applications to Her Majesty and to His Royal Highness, through the proper officer, have received gracious replies.

"998. Therefore it is not quite an accurate statement to say that the Depart of Science and Art is the only department which has access to them?—Certainly not.

"999. Your opinion also is, that if the trade has not access to those public departments, it ought to have it?—Not as concerns the Royal property.

"1000. Take the case of the National Gallery?—I should say that as one of the public that, under certain restrictions, the public have a right to what their money has bought.

"1001. Mr. *Adderley.*] Do you mean all the public?—No, I do not say all the public; I mean the public who are qualified by their position.

"1002. Mr. *Joseph Locke.*] You mean the general trade?—I mean the public who can establish a claim founded either upon their own talent or their standing; everything should be thrown open under proper restrictions, and it should not be narrowed into a Government monopoly.

"1003. *Chairman.*] You say that you received permission to take the cartoons down from the walls; is that so?—There is the letter dated 12th January, 1859, saying, 'You are to be permitted to photograph at the same time as the Department of Science and Art, and to share in every respect in the facilities which are afforded to them, the necessary directions having been given to Mr. Willshire.'

"1004. I understand that the construction you put upon that is, that you were at liberty to take those cartoons down from the walls?—No, because there was somebody there to take them down.

"1005. If there had been nobody to take them down, do you consider that you were at liberty to take them down?—Certainly not; I should decline the responsibility of taking them down.

"1006. Mr. *Joseph Locke*] Do you see any reason why you should not have the same facility for taking them down that was given to the Department of Science and Art?—Not the slightest; we could deal with them as carefully as they could; I have no proof of it, but I believe that the plans which the Department of Science and Art offered to the Board of Works for taking down the cartoons were not approved of. A long correspondence ensued between the Department of Science and Art and the Office of Works, as to the best mode of taking these things down; and Mr. Redgrave, who has the guardianship of those pictures, felt that there was some risk; but the only thing was to have them moved under some one having the responsibility.

"1007. Mr. *Beamish.*] It was for expenses incurred that you were charged the 30*l.*, was it not?—Yes, which we did not know we should have to pay.

"1008. Did you expect that they were to be taken down for you at no expense?—We thought nothing about it.

"1009. You complained of having to pay the £30?—Yes; because a portion of the charge was for time, and we said that the time had been used by the Government photographer.

"1010. Sir *John Shelley.*] You would admit, would you not, that with such valuable property as the cartoons at Hampton Court, it would be quite out of the question that anybody, except the officer having the care of that property, should be allowed to have the removing of them?—Yes.

"1011. Supposing it had not been determined that the Department of Science and Art should take photographs from the cartoons, do you think it would have been fair towards the general public that your house, and your house alone, should have the photographing of them?—Quite fair, if we were the first applicants. The law recognizes that an idea is property. A work projected in a peculiar manner is an idea, but the pictures in a public gallery being public property, it follows that though it would be an infringement of copyright to copy the copy, the authorities might allow the original work to be copied again; but I have already mentioned my views as to tenders for all public works.

"1012. Would you not you say, in fairness to your co-traders, that if there were to be an opportunity afforded of taking photographs of this valuable property, the general class of photographers should be aware that such an opportunity was to be afforded, and that they should have the same facilities?—No; I could not allow that, because an idea is property.

"1013. The idea refers to that which is public property?—Yes; but the use of it does not. If I write a book, the law gives me property in that book.

"1014. Do you mean the Committee to understand, that you think it fair towards a certain class of traders in the country, that because an individual has asked leave to photograph public property, he is to have the sole right to do it, and the sole power of selling the photographs?—It is difficult to answer general questions of this kind. There are certain common sense rules that occur to everybody.

"1015. Would not that be, as regards the generel trade of the country, giving you the monopoly, instead of giving it to the Department of Science and Art?—Supposing it were, which I do not admit, we should exercise it in a far more liberal way, because we would exercise it to benefit, not to crush our fellow traders.

Hints to Colorists.

To Improve a Bad Collodion Positive.—When some faint and ghostly or black and sooty image in a fog, chances to be the sole relic of a deceased relative or friend, its improvement in the process of colouring may be important. For this purpose, supposing it be the pale over-exposed and over-developed image, mix a little Indian-ink in gum water, and with a fine sable pencil proceed to strengthen the outlines with a very faint indefinite touch and a rather dry brush, strengthening the touches gradually and carefully until of the required distinctness. Next take a little of the powder colour labelled Grey No. 2,* and strengthen the half tints of the face until you obtain some degree of roundness, carefully avoiding parts already touched with the water colour, to which the dry tints would adhere too thickly. This done with the same grey, darken the background about the head, and then carry a coat of varnish over the whole. You may then finish with powder colours in the usual way. In the case of the black under-exposed-picture. You must here mix as before a little thin Chinese white, and with this, in the same tenderly careful way as before, strengthen the whites of the eyes. Use then a little of the indian-ink mixture exactly as advised for the former; and to finish, take a little powder, Grey (No. 1.) and work it into the more delicate half tints, and use a little powder white for the high lights Although the picture will now look a very smudgy comical affair, a coat of varnish and careful after-colouring will now, however, do much towards making it more presentable.

The above methods require some little skill, therefore it would be better if, the amateur tried them upon copies instead of risking the safety of the original, which, however valueless in a photographic sense, may be priceless in other eyes. We have earned no little gratitude by the successful practice of the "dodges" here described.

Difficulties in Colouring Glass Positives.—A very common difficulty in colouring glass positives arises from the colours refusing to "bite" or adhere to the surface of the picture. This proceeds from two or three causes, and may be either the fault of the picture, the colours, or the manipulation. A bad picture is always difficult to colour, but there is also a certain class of positives, which, although very brilliant and good as uncoloured pictures, are very difficult, from having a smooth metallic surface to which the colours refuse to adhere. These are frequently pictures which possess a very thin white deposit of silver, and are generally produced by very rapid development, springing into existence "at a blow" as it is described, the moment the developer is applied. Where such pictures have to be coloured, considerable care and tact is necessary to succeed well. Very little colour must be applied to the unvarnished film, and that only to the lights of the picture. It should be borne in mind that the colours adhere well to the thick granular deposit of silver, but scarcely at all to the collodion film without silver, which forms the shadows of the picture. Where, therefore, as in this case, there is very little silver deposited on the surface, there is very little "bite" for the colour. A biting surface has, therefore to be produced. This is effected by means of a varnish. Two things have to be avoided here; either a sticky surface, to which the colour adheres in patches and prevents softening; or a hard, highly glazed, or glassy surface. With the former it is impossible to get delicacy and gradation, the colour sticking wherever it touches in smudgy patches; while on the latter it is difficult to get the colour to adhere at all. The varnish best suited for the purpose is a light-bodied varnish made of some fine, hard, but biting gum. The varnishes we have found to answer the purpose best, are either that sold as the "alabastrine varnish" by Squire, or Newman's colouring varnish. To the surface thus obtained the colour adheres readily, either without or with previous colouring on the collodion film. Bad colours will not produce a good effect under any circumstances, and it is poor economy to buy cheap or low priced colours for such a purpose.

The kind of picture most suitable for colouring with powder colours is, that possessing a good deposit of silver, not, of course like a negative, but approximating in that direction. A somewhat old and good bodied collodion, with exposure just sufficient to give a fine picture by slow development generally gives the surface to which the colours take most kindly. The picture will be somewhat chalky in the lights and not perfectly transparent and black in the deep shadows until it is varnished. Such a picture may be fully coloured in all the flesh tints, and some other parts previous to varnishing, and again afterwards. With the varnishes we have named, we have sometimes varnished and coloured such pictures several times alternately, without causing the colours to move or become muddy.

Defective manipulation generally arises from over-haste or carelessness. Patient, steady application of the colour, a little at a time, using the brush in a circular manner, endeavouring very gently, to make the colour combine, as it were, with the surface, taking care however, not to abrade it. The use of care, taste, and judgment, and observance of the principles here indicated, will generally ensure entire success.

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* Newman's List.

Talk in the Studio.

THE NATIONAL GALLERY.—The proposed improvements, for which £15,000 have been voted, are rapidly progressing. The design to be carried out was executed by Mr. Pencthorne, and without extending the site already occupied, a great increase in available space will be secured. A new room will be gained which, as is already decided, will be appropriated to the principal pictures of the Italian schools. Its length will be 75 feet, and its situation will be on the right from the top of the stairs, Additional room will also be secured for the sculpture.

SOUTH KENSINGTON MUSEUM.—New pictures are continually making their appearance. Among the last additions we find productions by Mulready, Sir Edwin Landseer, Penry Williams, W. Boxall, Frith and Collins.

THE PRINCESS FREDERIC WILLIAM of Prussia has been elected honorary member of the Berlin Royal Academy of Arts, an honour conferred upon her, as her royal highness gracefully admits, for the interest she has always shown in matters of art.

VICTORIA CROSS GALLERY.—The more important of these paintings have been recently photographed and published.

M. ALBERT, OF MUNICH, has recently published a set of eight photographs from some celebrated chalk drawings by Wilhelm von Kaulbach, of which it is said that upon a gentleman passing his hand over them, the artist, supposing them to be the originals he had himself executed, reproved him, saying, "that was not the way to treat a finished chalk drawing." A correspondent of the *Art Journal*, speaking of these, says, "We all know the value attached—and justly so—to the original drawings of a great master. It is natural that such should be valued, for in them lies the very soul of the artist himself, guiding his hand, and here letting it glide along with the utmost lightness, while there, in bold and harsher touches, sterner emotions become visible as they pass over his mind. Who has not longed to possess such, and felt how insufficient was the best engraving or other copy when placed beside the original piece? For in a drawing there is more individuality than in any other of an artist's works, there is more of himself in it than in a painting. In the lines and outlines, all clear before you, he reveals his inmost self. And this it is which *really* gives such so peculiar, so unique a value. We not only have a drawing, we have a portion of the man, too; and therefore do we set such value on these copies of M. Albert. Each one is, in reality, an original drawing, in the fullest sense of the word, from the hand of William von Kaulbach." These photographs are two feet and a half high, and are to be shortly published in England.

A NORTH LONDON SCHOOL OF ART, in connection with that at South Kensington, has been projected.

NEW USE FOR PHOTOGRAPHIC CHEMICALS.—A remarkable trial recently occupied the court of correctional police at Versailles, in which a M. Thiébaut, described as a well-known photographer, and his wife figure. It is a long tale of love, jealousy, infidelity, and vengeance. The wife was charged with disfiguring the paramour of her husband with photographic chemicals. She admitted that she had been in the habit of carrying a bottle of nitrate of silver in her pocket for the purpose of disfiguring her rival. She subsequently threw a quantity of sulphuric acid over her, and beat her severely with a stick.

ELECTRIC LIGHT FOR PRINTING.—Mr. Bingham laid before a recent meeting of the French Photographic Society several positives printed from negatives by means of the electric light, using Professor Way's lamp recently described in our columns. It is stated that the time required was less than that of the solar light. We presume this means less than a bad solar light, as recently described by Mr. Malone in using a Dubosc's lamp.

PHOTOGRAPHIC MEETINGS IN DECEMBER.

South London - - - -	Thursday, 20th.
North London - - - -	Wednesday, 26th.
Blackheath - - - -	Monday, 17th.
Edinburgh - - - -	Tuesday, 11th.
Birmingham - - - -	Tuesday, 25th.
Chorlton - - - -	Wednesday, 12th.

To Correspondents.

AN ASPIRANT.—No. 1 and No. 6 stand first; No. 5 next; No. 2 next; Nos. 3 and 4 are not makers, so far as we know. As regards price, you will best ascertain by procuring catalogues from each. The best makers give you a thoroughly good lens at a good price. Low priced lenses are sometimes good; but you do not secure absolute certainty at a low price.

T. X. Y —The name of the firm is Lerebour and Secretan. We know of no means of detecting forgery except the quality of the lens. The name is on the brass work, and, we believe, written round the edge of each lens.

H. H. C.—See "Hints to Colourists," in the present number. Unless your positives are very carefully sealed they will oxidize if unvarnished. 2. Newman's. 3. Nitric acid is best to clean a vessel which has been used for iron solution. Your bath will, by this time, be all right, but probably a little weakened by part of the silver being thrown down. Filter and strengthen if necessary. 4. We have repeatedly given the formula for making a developing solution of protonitrate of iron; but will once more repeat it:—Dissolve one ounce of powdered nitrate of baryta in sixteen ounces of water, and when dissolved add two drachms of nitric acid, s. g. 1·400; to this solution add one-and-a-half ounce of powdered protosulphate of iron. When thus dissolved, filter to remove the insoluble sulphate of baryta. The solution is of an apple-green color, and contains two parts of protonitrate of iron, and one part of protosulphate of iron; a full amount of exposure is required, and the development is rather slow. The resulting picture is somewhat metallic, and very pure and brilliant in tone. This developer is somewhat feeble in cold weather, and may, with advantage, have a still larger proportion of a solution of protosulphate of iron added.

N.—We are obliged by your communications. Things which ought to have been known, are often overlooked.

CLIPSON WRAY.—The formula is one with which we have long been familiar, and have found uncertain in operation and result. The rectified spirit is altogether unnecessary.

A. W.—We presume there is really a copyright in the engravings in newspapers; but you will scarcely run any risk, we apprehend, in copying them if you wish, as it is not probable the copyright would be claimed. Cotton wool is used in various ways in masking: spread it out on the pressure-frame, pulling it out softly to the form required, and then lay a card with a suitable aperture upon it to keep it in its place. The wool will project loosely about half an inch beyond the aperture of the card.

G. S. S.—The chief fault in the mounting of the stereogram sent, is very common; one half has more cut from the bottom than the other, so that the tops of the towers are not the same height—the distance between the two is right for most eyes: you may, possibly, require a modification to suit your own sight. Try three: one with two and a half inches from centre to centre; one with two and three-quarter inches; and one with three inches. You will then see which suits your eyes best. Take care to cut them true, and square, with same amount off top, bottom, and sides of each. Papers on printing by development have appeared in various former numbers of the PHOTOGRAPHIC NEWS. We shall, probably, insert something shortly. You need never hesitate to ask questions, or apologise for the necessity. We have great pleasure in helping our readers.

N. C. C.—Acetate of iron, made by adding acetate of soda to protosulphate of iron, will keep a short time, but it is better used fresh. It should not need filtration. Intensification may be delayed some hours after development. Place the plates in a dish of distilled water, and keep them from a strong light until you have leisure; then intensify and fix. We have not tried Dr. Saudar's process. Any good negative collodion should answer the purpose; but the one most likely to give good results will be an intense collodion of the powdery kind, and containing a bromide as well as iodide, which is not always the case with the negative collodion of commerce.

J. B.—We agree with many of your remarks, and it will be our aim from time to time, to remember the wants of the beginner as well as the more advanced student. Strictly elementary papers will from time to time appear on the positive as well as other processes.

N. W.—There is no reason for doubting that a lens of one inch and one-sixteenth diameter will cover a ten-inch plate. It is the focal length of a lens and not its diameter which determines its power in this direction. We have before us at this moment a lens of less diameter than the one you name, which covers ten inches. As a general rule a lens will cover a space two-thirds its focal length. The custom of making lenses larger for large plates is to obtain greater rapidity of action. A dispersing lens must be concave on one or both sides. The plane side if there be one, should be turned to the other; but unless it is properly mounted for the purpose we cannot recommend you to use it. It is never well to strain the powers of a lens, that is, approach too near the object. We prefer to have the deep shadows of a print somewhat bronzed in the printing frame. The toning will remove this and give you deep blacks in their place. Albumenized paper is better when used fresh; but we have obtained good prints from paper we have had two years. Much depends on its preparation and place of keeping afterwards.

W. P —You may enlarge from a stereo negative to 12 by 10 easily. First obtain an enlarged transparency in the camera from the negative, and from that transparency again, an enlarged negative. The stereo will be enlarged to about twice its height and breadth and the transparency again twice You can manage it with the camera you name. All light must be excluded except that which passes through the negative into the camera. A genera distance for the placing of stops in front of the lens is about the diameter o the lens. The further from it, the flatter the field; if too far off, some light will be cut off the corners.

W. D.—We do not know of M. Wray an optician. Pure wax is generally t be obtained of any chemist, certainly from any photographic chemist.

F. P.—There are a great variety of excellent dark boxes manufactured fo sale; but it would be an invidious task to say which is the best, as eac have special advantages. An excellent one is described in this number.

WM. STURGEON—The subject of backgrounds in our next.

G. G.—The articles to which you refer were contributed by the present editor we are obliged by your suggestion which shall receive careful consideratio We shall have pleasure in helping you with information on the subjec indicated.

J. PORTER—Moule's Photogen is the light to which we presume you refer The lamp for burning the light is patent; but not the light itself. Th address is Seabright Place, Hackney Road.

CLYDESDALE, W. B. B., and others, in our next.

THE PHOTOGRAPHIC NEWS.

Vol. IV., No. 119.—*December* 14, 1860.

SCIENTIFIC GOSSIP.

We have been much pleased lately with an inspection of an ingenious plan of arranging a graduated background, which we have seen in a friend's studio. The principle may be applied to any background with but a trifling addition to the expense, and the pictures which we have seen show so decided an improvement over those ordinarily taken, that we have no hesitation in availing ourselves of our friend's permission to place the description on record in the pages of the Photographic News, for the benefit of every professional or amateur artist. The additional apparatus required to be added to the ordinary background consists of a wooden or opaque cloth frame or hood, projecting all round the upper part of the screen to the extent of about four feet, so as to form a recess of that depth, at the back of which will be the background. This frame can be made to slide up and down by means of a cord and pulley, or it may be hinged on its three sides to the back frame, so that they may open outwards. In either case, by a little arrangement, the proper amount of light and shade can be obtained on a white background to suit any style of sitter, and thus grey heads, white caps, or light-haired children can be taken with the same background as dark figures. The outside of the hood may be painted light blue, or other light tint to suit the remainder of the room; but the inner part must be of some dark colour, so as to avoid the reflection of light on those parts which it is the object of this contrivance to keep in shadow.

The subject of arsenical paper-hangings is one which has on more than one occasion attracted attention in this journal. Apart from the consideration that the subject is one of the highest importance to every one who spends much of his time in that state of civilization which renders the paperhanger's art necessary, we know of very many photographers who delight in paper of a very lively green colour for their reception and glass-rooms. Certain facts, which have recently come to our knowledge, respecting the ill effects of inhabiting rooms which are papered with this arsenical paper, we think of such importance that we should not be doing right if we were not to bring them prominently before our readers. The facts, as they have been placed before us by Mr. Crookes, are as follows:—Several of the bed-rooms in his house happen to be covered with that pleasing looking, but fatal paper, which owes its treacherous beauty to the employment of arsenite of copper, or Scheele's green, as it is called. A constant irritation of the mucous membrane of the throat, which that gentleman, as well as all his family who inhabited these arsenical rooms, continually complained of, gradually drew suspicion to the green paper-hangings. Mr. Crookes accordingly collected from the top of a wardrobe in one of these rooms, three and a half grains of the fine dust which had settled there from the atmosphere of the room. An examination by Reinsch's test was made, every precaution being taken to prevent the possibility of error in the result. After boiling for a few seconds, the copper became of a dark steel colour, and the subsequent operations being completed he obtained a comparatively large quantity of arsenious acid in the form of beautiful octahedral crystals. This, considering the small quantity of material analysed, appears sufficiently alarming; but if, instead of taking dust from a surface in close proximity to the ceiling, it had been collected from the floor behind the wardrobe, there is no doubt the quantity of arsenic obtained would have been much larger, but would have given a more correct idea of the extent to which it impregnated the atmosphere, since the particles of arsenite of copper have a great tendency to fall towards the earth from their high specific gravity.

Whatever doubt our readers may have hitherto felt on the subject of the danger of living or sleeping in rooms the walls of which were covered with green arsenical paper, will we hope now be set at rest. The constant inhalation of an atmosphere contaminated with minute quantities of arsenic *must* have a serious effect if it be long continued. In the case just mentioned we find indeed that its effects were strongly marked, the parts of the throat upon which the arsenical atmosphere impacted during breathing having become imflamed, and irritated to a considerable extent, and it even remains a question whether some of this deadly poison may not have found its way into the lungs. It is, we know, commonly supposed that arsenic accumulates in the body when taken in minute doses, and that inasmuch as people swallow it daily in the water they drink in one part of the world, and eat it in the form of a powder in another part, without appearing to suffer from it, there cannot be much harm in inhaling it in such minute doses. In the first place we believe it is not the case that the arsenic remains in the system, and in the next place there is all the difference in the world between taking certain poisons into the stomach and bringing them into direct contact with the blood. There are poisons which are perfectly harmless in the first place, but are most deadly in the second. In our opinion, and we are glad to find that other members of the fourth estate agree with us, the men who make and sell such paper ought to be considered as partially, at least, answerable for the injurious consequences which they bring about. To say that they do not know that the colouring matter of the paper is of such a deadly character, would be absurd; there is not a maker of such pigments in England, or anywhere else, who is not perfectly well aware of the injury they are capable of doing to the health of individuals. The fact is, Scheele's green, as the arsenite of copper is termed, is not only cheap, but produces a green of peculiar brilliancy. The public for the most part, knowing, nothing of the danger of covering their rooms with such paper, give it the preference over that of a duller tint; consequently there is a great demand for this paper, which so long as it lasts, the manufacturer will continue to supply, utterly regardless of the results. The time which Parliament occupies in remedying an abuse, even when it can be induced to take it in hand, is so long, that we are not very sanguine of help from that quarter; but if the press generally makes the facts which we have stated known to the public, it will be the fault of individuals if they suffer themselves to be poisoned in this way any longer.

A patent has just been taken out by a Mr. J. Denis, of Queenhithe, for improvements in the manufacture of paper, which is likely to be of great use to those who make paper for photographic purposes. The invention relates to an entirely new treatment of textile plants for converting them into paper pulp, consisting, first, of a new chemical composition for the steeping, which in its effect destroys the gums, resins, oils, and fecula, without altering the fibre of the plant; secondly, the extraction by means of new composition of hydrochloric, sulphuric, and nitric acids of the metallic sulphates; thirdly, of new combinations of chlorides, which are considerably reduced in strength, by which means they may be heated without danger to the tenacity of the fibre, to about 104° F.; fourthly, the novel application of a chemical agent to disinfect the matters and neutralise the acids; fifthly, of a new form of plate as a purifier in the cylinder pulping engine; and, lastly, in the method of treatment, which ensures the production of a good and fine pulp for paper.

DIALOGUE SKETCHES.—No. 3.—IN THE GLASS-ROOM.

(From a "Photographer's Common-place Book."[*])

> "Yet some there are who indiscreetly stray
> Where purblind practice only points the way."—M. DU FRESNOY.

No, this is not the place you imagine it to be; but a noisy, bustling London thoroughfare, with a roar of traffic welling up into the smoky atmosphere shrouding its crowded housetops, and an ever-coming ever-going stream of hurrying pedestrians elbowing their way along, with true English-like earnestness of purpose, bearing to their thousand-fated ends their thousand-varying purposes.

This newly-opened "photographic portrait gallery," with cases of coloured miniatures on either side of its doorway, is Crackdbell's. One glance at the specimens might at once inform you of the fact, so wondrously similar are these painted photographs to Crackdbell's painted drawings. Look, all the eyes are enlarged, all the mouths decreased, the hands are claws, the flesh is wax, and the stock simper, which the artist calls a smile, is the one poor expression common to nearly every face. You must know that Crackdbell, and many, *many* other worthy folk, more vain than wise, believe that this photography is after all but an ill-natured misanthropical power, delighting in slander and distortion; that in defiance of optical law, and popular ideas, it will obstinately insist upon making the eyes small and the mouth large, and won't, on any account believe that they being nearly on the same plane, will, therefore, be represented exactly as they are in nature. Then, as to the hands, why the best lens you can get will insist upon making them so monstrously large, that they are nearly as long as the face itself, the absurdity of which you may at once prove by measuring your own hand against your own face. So Crackdbell "*corrects*" all this, and, as he says, puts his photographs into "*proper drawing*,"—that is to say, into that drawing which he once believed popular and proper. However, as we can't stand at his door any longer, and I will just prove you, my dear reader, to be nobody at all, and then we'll go on our way.

If I am addressing you without seeing you it is clear that you are invisible, and as you can't see me, I also am invisible. This being the case we may at once whisk through this keyhole, and up these stairs, and into Crackdbell's glass-room, unobserved by the latter gentleman or his two companions, viz., Brushart and Snailowl, whose conversation may, perhaps be worth our hearing.

Snailowl.—Photography has had its day, that's about the truth of it. There are too many of us, and if I am wide-awake, and understand what I read, the cause too is tolerably plain.

Crackdbell.—Yes, I'm afraid it must be so. Why, *I* haven't had a soul up for a picture for these three days past. I don't find my photography much more flourishing than my painting.

Snailowl.—Flourishing! no, there's no more flourishing for us photographers, I can tell you. It's all swept away by the rushing torrent of amateurs, cobblers, tinkers, tailors, lawyers, clerks, doctors, and parsons, egged on by the everlasting baits of journalists, and camera and chemical sellers, who give instructions for buying their stuff. Why not offer to give instructions in the healing art to all who buy medicine, or teach gratis electroplating, electrotyping, lithographing, the use of microscopes, telescopes, and all other scopes, as well as cram the world full of photographers?[†]

Brushart.—Why not?

Snailowl.—Why not! If you had had your profession taken out of your hands, and given to a swarm of amateurs, you would understand *why* not. I can speak feelingly; my profits have not cleared my chemicals for months.

Brushart.—Indeed! I am sorry to hear that such is the case; but may there not be some other cause for your present unfornate position?

Snailowl.—Other cause! Why, what other cause could there be, I should like to know? The other day a Belgravian puppy was lamenting in an aristocratic photographic journal, that as he had no more friends to take, he would like to take street views, but was afraid people would stare at him. There were no pistolgraphs at that time; but I could have put him up to a dodge, by dressing him up as a "flunkey," he could then put a lens at the side of his hat, tied as a girder, and it would pass as a cockade. But, no; I had rather he would think how many poor fellows he had robbed of a loaf of bread, by taking his rich friends, who could and would have paid some one had it not been for him; and as there are some thousands of such rascals it must tell in time!

Crackdbell.
Brushart. —Ha! ha! ha! ha!

Snailowl.—Ah! It's all very well to laugh; but it is no laughing matter to us poor from-hand-to-mouth brethren.

Brushart.—I think I could suggest a cause; but—

Crackdbell.—The idea of our poor amiable friends Smith, Brown, and Jones, whose money and time have been so generously expended in the pursuit of the attractive art of photography, with such small results beyond blackened fingers and wasted chemicals, being dubbed puppies and rascals for their pains; ha! ha! ha!

Snailowl.—Oh! I mean skilful amateurs.

Crackdbell.—Does skill constitute rascality then, Snailowl?

Brushart.—And are skilful amateurs so numerous? or are professional men so inferior to them, that with every advantage in their favour, they cannot out-distance those who have every disadvantage to contend with?

Snailowl.—I've seen amateur pictures quite as good as my own.

Brushart.—Then improve your own. If I sit down on the race-course of life, and go to sleep, what right have I to complain on waking that so many competitors have gone a-head of me, that there is but small chance of my ever overtaking them? Competition is the life of business, and progress is success. If my household furniture is ugly and unsatisfactory, in consequence of modern improvements, I refurnish my house, and so improve the broker's trade; but if the furniture I bought so many years ago is as good as that I now see in the shops, what reason can you give me for discarding the old and purchasing the new?

Snailowl.—What right have you to imagine that my work is not as good as the best?

Brushart.—Only the right which you gave me, when asserting that amateur productions equalled your own, and were so common as to ruin the profession; for if that is the case, both you and every other member of your profession must be to blame. Laziness or neglect will invariably be followed by poverty and disgrace.

Crackdbell.—Well, it certainly is a fact, that while photographic amateurs have been pursuing their art with untiring energy, purchasing journals, communicating their experience, prosecuting experiments, forming societies, exchanging specimens, and seizing every opportunity, not only of improving the art they love, but of generously communicating such improvements to the photographic world at large; many professional operators, confident in their fancied superiority, have neglected every source of increased knowledge, held themselves jealously aloof from societies, sneered at the journals they never read, and never moved one inch beyond the starting-post, seeming to believe that "purblind practice," and the simple fact that they were professional, would more than suffice to win for them a palm due only to superior ability.*

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[*] Continued from p. 376.

[†] I should have made Snailowl rather more logical, had I really created the character; but I am sorry to say he is not purely imaginary, these and Snailowl's following remarks being quoted from a letter which appeared in the last number of a contemporary.

Brushart.—If this is true, who can wonder that photography should cease to be a profitable profession? But all the photographers of my acquaintance, whose productions are really good, seem to be in a very flourishing condition, and I have heard many of them affirm a belief in the increasing prosperity of their art. You must remember, Snailowl, that not only scarcity of *quantity* raises the market price, but scarcity of *quality*, and the last is as good a sign of prosperity as the former. No good progress ever yet came from darkness or stagnation. The monks of old who thought ignorance the best guarantee for religious prosperity were mistaken. The authors who thought the first printing-presses would ruin them by decreasing the prices of books, were mistaken. Tyrants who have thought political ignorance the guarantee of their own safety, have perished through their error, and so on right through the chapter.

Crackdbell.—I'll you a little story, Snailowl, which may add some force to Brushart's remarks, and perhaps convince you that these journals and societies are not exactly the evil things you imagine them to be. There was once a certain sly old raven, with a passion for burying every trivial morsel of rubbish chance might throw in its way. Upon one occasion master raven found a rushlight burning in a candlestick; cocking his head aside, he contemplated this new discovery with some little perplexity, quite at a loss how to conceal his newly-acquired light from other eyes. In his extremity he appealed to a friendly owl, and the owl advised that he should place over it a certain small bushel measure. With some difficulty and infinite pains, the sage pair contrived to do this, and for some time after the raven would chuckle on the top of the bushel and cry to all who came near, "Aha, you can't see my light!" At last a man named Amateur drew near and acknowledged that he feared his light was indeed under a bushel. "Yes, under a bushel," cried the raven; "aha! you can't see my light!" Upon this the man raised the measure. Poor raven!—the rushlight had expired in its socket, and there was nothing but a stink!

Brushart.—Ha! ha! ha!

Snailowl forces a somewhat dreary laugh, and stating that he must be off, bids them adieu, takes up his hat, and makes a thoughtful exit.

Crackdbell.—Upon my word, we were rather hard on the poor fellow.

Brushart.—True; but it may perhaps induce him to dip deeper into the truth before he ventures to speak so confidently of effects and causes. Your mere shallow dippers are invariably so dogmatic.

Upon my word I can hardly abstain from throwing off my invisibility, and asking Crackdbell if *he* has not been a Snailowl in *his* profession. If this fast-going young racer, Photography, did not find him at the starting-post fast asleep upon a heap of conventional untruths and petty ignorances, dreaming of the waxen heads in hair-dressers' windows, instead of pursuing the true and beautiful in art and nature? And I should like also to ask Brushart if he, too, is not a Snailowl, refusing to take the peas out of his shoes, because he believes the Photography which advises him to do so is a powerful rival of his art, instead of its powerful friend and relative? I *should* like to do this, upon my word I should, only I'm afraid that they might retaliate by calling me a Snailowl too, and that I could not deny it so confidently as I should wish to do.

Crackdbell and Brushart are still talking, but we must leave them until next week. So, for the present, good-bye, my invisible friend, good-bye. A. H. W.

NOTES AND JOTTINGS.—No. 1.

Introduction.—Herr Pretsch's Photo-galvanographic Process for Block-printing with common Letter-press.—Mr. Hardwich on Dry Plates, at the last Meeting of the Photographic Society.

Under the above title we purpose making short comments on current subjects of photographic interest; offering hints and suggestions on matters requiring investigation; giving the result of experiments, completed and in progress—in short, for no one reads introductions—making "notes" on anything, and "jottings" on everything not of sufficient importance to constitute separate papers.

The most Prominent Novelty which has of late appeared before the photographic world is Herr Paul Pretsch's process for producing blocks for illustration, by means of photography and electrotype, capable of being printed from in the ordinary printing-press. Though deficient in half-tone, the prints show considerable detail and sharpness; and for bold artistic subjects the process is admirably adapted, even in its present state. A grain, very similar to that got from a lithographic stone, which takes the place of the delicate tones in the silver print, will probably, indeed we may say certainly, displease our friend *Process*; but let us hope that *Lovetruth* may not be quite of the same opinion, and that *Brushart* "could almost call it artistic," although, "after all, you know, it is but a photograph."

The particulars of this process have not been published, so that we are left to conjecture the method employed. The direction of some experiments to this end, in which we are at present engaged, may, by publicity, induce some of our readers to take the matter up.

Herr Pretsch's photo-galvanographic process is well known, and our experiments, founded on it, are as follows:—A piece of glass coated with thick solution of gelatine, containing bichromate of potassa, is exposed to light, when dry, under a negative. On immersing in cold water, those parts on which light has not acted swell up, whilst the reduced bichromate renders the other portions insoluble. We thus obtain a picture in gelatine, possessing a very considerable amount of relief, and of which it is necessary to take a copper-plate impression, by means of the electrotype process. This can be effected in many ways: we will name two. First, while the gelatine is still moist, take a mould of the picture in gutta-percha, from which a copper matrix can be got by the electrotype. The second method we would suggest is to coat the plate with a solution of iodide of potassium, dip in a nitrate of silver bath, expose to daylight, and pour on it the ordinary developing solution. By this means it becomes coated with a delicate film of metallic silver, and may in that state be placed in the copper electrotype bath. After exposure under the negative, the plate can be immersed in hot in place of cold water, and thus the soluble parts dissolved away instead of being swelled out.

Our experiments are not yet sufficiently conclusive to warrant our giving more minute details.

At the last Meeting of the *London Photographic Society* Mr. Hardwich strongly advocated dry plates, which gave great density in the lights. We are sorry that such inartistic advice should come from so influential a source. The fault of nearly all dry plates is that they give far too much contrast, and so produce unpleasing, chalky positives. In the Taupenot process we dare not push the development too far for this very reason, and thus are often obliged to stop before the half tones are fully brought out. But, following Mr. Hardwich, if, after the second sensitizing, we pour over the plate a chloride in solution, and then wash under the tap, we lose density but not sensitiveness. Thus, development may be pushed, so as to bring out the half tones without getting too much intensity.

Mr. Hardwich further states that the salted plate may have its property of producing dense negatives restored by pouring over it a solution of gallic acid. Considering all this, the follower of the Taupenot process may glean a few useful hints, which we will endeavour to place before him in a plain form:—

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* I cordially agree with Crackdbell, firmly believing that this view of the case comes nearest the truth.

1. In all dry processes when the nitrate, or any other soluble salt of silver is in excess, the keeping qualities of the plates are extremely limited.

2. Taupenot plates, notwithstanding that the second bath contains a large amount of acetic acid, cannot be depended on after a few days in summer weather, containing, as they do, an excess of nitrate of silver.

3. By precipitating the small portion of nitrate of silver still remaining in the film after washing, as a chloride or other insoluble salt, the keeping qualities of the Taupenot plate equal that of almost any other, but we lose density.

4. The density, if desired, can be restored, and the keeping qualities retained, by means of gallic acid solution.

Michael Hannaford.

OBSERVATIONS ON VARIOUS PROCESSES OF PHOTO-LITHOGRAPHY.

Having stated the details of his own process,* Mr. Osborne passes in review the various methods adopted by former discoverers to produce a photographic image on lithographic stone, and points out their weak places and shortcomings.

M. Lemercier, in 1853, and Mr. Macpherson, in 1856, have published processes almost in every respect identical: they both assure us of very successful results, as far as drawings showing a "grain" are concerned, that is in a style suitable for landscapes and portraits, but indifferently adapted for maps, plans, music, &c., &c. The "sensitive surface" they use is formed on the stone by running a sort of varnish, made of asphaltum, over it, and the exposure is accomplished under a common negative. The circumstances which have prevented their methods coming into general use are, no doubt, chiefly the following:—

1st. Great irregularity and uncertainty in the photo-chemical constitution of each different sample of asphaltum.

2nd. The expense caused by the extravagant use of ether, large baths of which are required, in which to dip and soak the face of the stones.

3rd. The utter impossibility of timing the exposure, which if not done exactly, occasions the loss of a great deal of time and chemicals, and obliges the operator to begin again.

4th. The reverse nature of every impression produced, the result of working from a common negative.

M. Poitevin, in the year 1856, patented a process based upon the alterative action of light on gelatine or gum when associated with bichromate of potash. The stone, or other material prepared to receive the design, has its surface covered with a layer, produced by running over it a solution of gelatine or some such substance, in conjunction with bichromate of potash, and is then exposed to the action of light in the camera, under a negative or under a positive. After exposure it is wetted with water, and the lithographic ink rolled in, which attaches itself only to the parts acted upon by light, inasmuch as they remain dry and unaffected by the water; it is from this inked surface that impressions can be multiplied in the press.

Taking M. Poitevin's process as it stands in his specification, it is subject to the following critical remarks, viz.—

1st. If he exposes in the camera, or under a positive, as he suggests, he will, as he himself tells us, produce a negative picture on the stone, the use of which it is impossible to conceive.

2nd. If he exposes under a negative in the way he describes, he will produce a "direct positive" on the stone, and a reserved positive on the printed impressions, which are useless, save in the case of portraits of an inferior description.

3rd. In any case, the delineation on the stone, or other surface from which he prints, will wear out and give only a few impressions, owing to the film of altered gelatine which exists between the stone and the ink not resisting the combined effect of water, and the pressure and friction of the press, a fact strongly commented on by Mr. Pouncy at the meeting of the London Photographic Society.

4th. In consequence of his manner of wetting the whole gelatinous surface before applying the ink, he increases the difficulty of getting the ink to adhere to the altered parts of the coating; by smearing them with semi-dissolved gelatine, he deteriorates the quality of the ink which does adhere, and the ultimate result will be rotten lines.

Mr. Osborne next adverts to the process patented by Mr. W. G. Newton, in 1858,* known, if we remember rightly, as that of Cutting and Bradford, U.S. This gentleman, he states, prepares his stone or zinc plate in a manner very similar to M. Poitevin; he exposes in the camera or under a positive, and the result is that he has to use the altered insoluble parts of the gelatinous surface, not as points of attraction for the ink, but as a means of protecting the stone while he removes and inks in the unaltered portions; this method obliges him—1st. If he wants to get the best results, to expose in the camera; if not, to use a positive on paper, or a real positive on albumenized glass, all three methods of exposing having many advantages. 2nd. Inasmuch as he uses for the boundary of his lines that section of the gelatinous surface which is in contact with the stone, not that on which the picture is impressed by the luminous rays, he can never obtain the sharpest definition.

With these objections, I believe his process to be sound in theory, and by it he may produce good results, as far as landscapes and portraits are concerned, but not so when the copy of a map or any other design, composed of, and bounded by hard dense lines, is required.

M. Joubert, in a communication to the Academy of Sciences of Paris, has intimated his discovery of a photo-lithographic process, based upon principles differing totally from the foregoing, namely, some peculiar action exerted by iodide of silver upon gum arabic. The only notice of his invention I have been able to procure is in the *Athenæum* for Feb. 1859, where the description is too indistinct and sketchy to admit of any criticism.

I now come to my own process, which, judging as fairly as I can, I believe to be superior to all others, and perfectly distinct and new. I rest its superiority on—

1st. Its simple and thoroughly practical character, in virtue of which it can be easily learned and executed.

2nd. I produce by photographic means, a *bonâ fide* "transfer" in its technical sense, on lithographic paper, in lithographic ink, from which the image is conveyed to the stone by the well-known process of transferring, in such a way that it then becomes a genuine lithographic drawing, differing in no one respect from those produced in the ordinary way, and subject to all the operations and manipulations practised by the lithographic printer; the ink is not *on* the stone, separated by any interposed substance, but *in* it, as it ought to be; the stone will not wear on the press, or the quality of the drawing suffer, by any number of impressions short of 2000 or 3000.

3rd. My process gives direct results, working as I do from a common negative, which may have been prepared anywhere, at any time, or by any person. I form on the photo-lithographic transfer a "direct positive," in lithographic transfer ink; this, by being impressed upon the stone, gives a "reverse positive," from which direct prints may be thrown off in the press.

4th. By using transfer paper I overcome all the numerous difficulties which arise from having to expose a stone in the camera, or from having to expose it under a positive or negative, I exclude stones altogether from the photographic laboratory, and all cumbersome apparatus appertaining thereto. Besides which, the facility with which a piece of paper can be exposed under a negative is very great; from its flexible nature the most intimate contact can be established between the two, whereby the most minute details are obtainable, and the operator can, with perfect safety, examine the paper from time to time in the ordinary way, and stop when the change of colour is sufficient.

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* Photographic News, Vol. iv. p. 374.

* Photographic News, Vol. i. p. 125.

5th. That part of the photographic picture, which in my process takes the ink, is on that surface of the sensitive gelatine which is first struck by the luminous rays; namely, that surface which is in contact with the negative, and the lines and dots forming the picture are bounded by a section made through that which if in contact with the stone, or other material on which the gelatine is spread, whereby I produce the utmost sharpness of definition.

6th. I can prepare a stock of sensitive gelatinous papers, which will keep for a considerable time ready for use at any moment; whereas, when stones are used, they must be severally used when wanted.

7th. One most important peculiarity in which my process surpasses all others is involved in my method of inking. Other operators (M. Poitevin for example) who had used gelatine, after having exposed the sensitive surface, proceed by wetting it before applying the ink, with a view to keep the unaltered portions free from ink; the consequence of which is a part of the gelatinized surface is rubbed over the altered parts which represent the drawing, making them refuse to take the ink, or only to do so with difficulty; and the quality of the ink, and by consequence that of the lithograph, is very much injured; whereas I ink in, covering the whole surface of the photographic print while dry, before the swelling of the unaltered gelatine has depressed the positive portions of the print, and trust to the subsequent washing processes to remove the gelatine, and with it the ink from those parts which ought to be clean and white.

8th. The method I have adopted of applying the ink in the press, cannot, I believe, be surpassed; it gives the greatest regularity and accuracy as to quantity, and aids the affinity which exists between the altered gelatine and the ink, by the force with which it is applied.

9th. The coating of albumen on the paper, which precedes that which I apply of gelatine, is also of the greatest value, and its adoption is completely original. The solubility of dried albumen causes the albumenized surface to unite intimately with that of gelatine during the manufacture of the paper, and the readiness with which this under-coating of albumen can afterwards be coagulated, by simply floating it upon hot water, thereby rendering it no longer soluble in water, enables a sufficiently glutinous surface to be retained under the inky print when finished, to establish the important property which the "transfer" must possess of adhering to the stone during the operation of transferring. The coating of albumen also performs an important part in giving the paper a smooth and dense surface before that of gelatine is applied, whereby the quality and uniformity of the latter is much improved; and lastly, it has the effect after coagulation, of preventing the ink coming in contact, while washing, with the fibrous substance of the paper, the advantage of which is the production of cleaner and more delicate transfers.

10th. I also regard as a very valuable part of my invention, the means I have employed to glaze the coatings of both albumen and gelatine, with a view of getting the most delicate results, the possibility of glazing in the way described being one of the advantages I derive from working on paper.

11th. I can from the same negative produce an unlimited number of transfers, all equally good, so as to put any number of drawings of the same object upon one large stone, or upon different stones, so as to expedite buisness by employing several presses at once.

12th. The photographic delineation of a design can by my process be transferred to the stone with astonishing rapidity, one man doing the work of a dozen draughtsmen, and in many cases of a much larger number.

13th. I can also boast of actual superiority as regards the quality of some fine description of work, over what it is possible to do by hand.

14th. In washing off the ink, advantage is taken of the gelatinization of the gelatine in cold, as well as its solubility in hot weather, the swelled surface of the print enabling considerable friction to be applied without injuring the work.

Mr. Osborne concludes, after some further remarks, by expressing a hope that he will be able, at some future time, to show what may be done in grain stones towards the production of tints and shades, the process, as it at present stands, being suited only for the reproduction of lines and points

Photographic Tourist.

A PHOTOGRAPHIC VISIT TO THE ISLE OF WIGHT IN 1860.

After a hot and dusty journey from London by the direct Portsmouth rail, I was very glad to find myself on board the steamer, and soon safely landed on Ryde pier, crowded at that time with beauty and fashion, arrayed in marvellous hats, and most bewitching boots, the said beauty and fashion attended on by cavaliers, in yachting costumes of varied description; after some trouble I obtained comfortable quarters at the Pier Hotel, where everything was very nice, and for a fashionable watering place I did not consider the charges very unreasonable. I luckily met a friend here, who being a member of the Yacht Club was enabled to introduce me as a visitor there, where, among other good fellows, I was introduced to a certain eccentric major, one of the most ardent and successful followers of our art, of whom I heard the following good story:—It seems he had built a van of most professional appearance, to aid his favourite pursuit, and when at Shanklin one day, was accosted by a *party*, "I say, governor, what do you charge for taking likenesses?" The major, it was said, looked unutterable things; but the party still persisting in his request, was at last answered as follows:—"—— it, sir," said the irate man of war, "do you think, because you look like a tailor, it would be any excuse for my asking you what you charge for making breeches?" The roars of laughter this anecdote was received with are still ringing in my ears, but the easy, cool way our eccentric friend took the joke, I must say, excited my envy; he merely twirled his long moustache, and quietly asked the narrator, "Well, old fellow, and what would you have done?" "Why," replied his friend, "taken the man's likeness, and charged him five bob." "And spent it in brandy and water, I suppose," returned the major. This, however, is not getting very far towards the description of my island tour, so *allons*.

My first day's excursion was to Brading, four miles from Ryde, where a capital view of the church, with a nice foreground, may be got from a farm-yard directly opposite the church door. In the interior are some curious wooden monuments of the Oglander family; in the churchyard is little Jane's grave, and the quaint epitaph on Mrs. Berry's headstone—"Farewell, blest shade," &c. After photographing all these, I proceeded through the pretty village of Sandown, with its neat semi-detached clean-looking lodging-houses, to Shanklin, where at Hollier's Hotel I got most comfortable quarters. I was stirring betimes the next morning, and took one or two pictures of the village, including the celebrated "Crab Inn." After breakfast I proceeded to the beach, where I got a capital picture of the entrance to the Chine, but the rising tide put a stop to my labours in this direction; so I betook myself to the Chine, where I got some good stereos, but the swarms of visitors rather interfered, though nothing could exceed their kindness in waiting now and then till my exposure of fifteen or thirty seconds, as the case happened, was over. After what

I thought a good day's work, I strolled over the cliffs to Luccombe, one of the prettiest walks in England, or anywhere else: here a certain inward monitor reminded me that a mutton-chop was ordered for me at six o'clock precisely; so to Shanklin I retraced my steps, where I found my dinner ready, and appetite also, not spoiled by what the ladies call "those horrid chemicals." After my dinner, and a quiet pipe in the pretty garden of the hotel, I retired to my comfortable couch.

I was disagreeably surprised the next morning to find it a soaking wet day, but determined "not to be done." I braved the wind and rain, and walked to Cook's Castle, near Wroxall, a "modern ruin" I found it to be, to my intense disgust; continuing my walk I arrived at Godshill, a small village with a very fine church, and some handsome monuments in it to the Leigh and Worsley families; one especially took my attention, an altar-tomb of Henry the Eighth's reign. The sun reappearing, I was enabled to fully enjoy the magnificent prospect of the surrounding country from the churchyard. After a slight repast at the village inn, "The Griffin," I retraced my steps to Shanklin.

The next day brought me to Bonchurch. Here are many nice bits for the photographer, among them I may mention the old church, the pond, and the picturesque cottages at the entrance to the village. After doing justice to these, I proceeded through Ventnor to Steephill Castle; thence descending the cliff to Steephill Cove, a lonely little bit; my next picture was St. Lawrence's Well, and the little church afterwards. The shades of evening now warned me to seek a habitation for the night, and an omnibus passing with a vacant place, I stowed myself and implements on the roof, and, after a lonely drive along the Undercliff, arrived at the Sandrock Hotel, Niton, a marvellously picturesque place, completely covered with creepers and ivy.

The next day I journeyed to Black Gang Chine, taking two pictures of it; I hardly thought it worth a plate, except that the sterile, rugged appearance it presents makes such a contrast to all other parts of the Garden of England. After a walk along the cliffs to the westward, I engaged a fly to convey myself and traps to Newport, the market-town of the island. I found comfortable quarters at the "Bugle." Beyond the new church, the town has nothing to recommend it; so turning my back on it, I went to Carisbrook Castle, and, as in duty bound, photographed the entrance gate, King Charles' window, and the ruins of the chapel, not forgetting to see the donkey drawing water from the well, the depth of which is variously stated at from 240 to 500 feet. After sending my apparatus back to Newport, I strolled about the picturesque old village of Carisbrook till evening.

Early next morning found me at Shorwell; a fine old church, and (from the sign-post) a pretty picture of the tower, is to be got: thence through Brixton, Mottestone, to Freshwater Gate, terminated my day. Freshwater Bay gives one or two good pictures, but nothing very striking; the church photographs nicely.

Yarmouth was to be my last place to visit (as I was to return to town viâ Lymington and Southampton). This is a quaint old-fashioned place, with a castle, town-hall, and market-house, and enjoys still the dignity of a municipal corporation. The church contains a very fine white-marble monument to Sir Robert Holmes, governor of the island in 1692. One of the best inns in the island is to be found here, called "The George;" and boasts a landlord who, in the snug bar parlour, enlivens an hour by relating yarns of smuggling adventures and marvellous stories of his nautical experience.

If, sir, you consider this worthy of a place in the columns of the Photographic News, I trust next season, if I am enabled to revisit the island, to fill up "missing links," which inexorable time did not permit me to do this year.

Correspondence.

FOREIGN SCIENCE.

(From our Special Correspondent.)

Paris, 12*th December*, 1860.

The last meeting of our Photographic Society was a particularly interesting one. Most of the novelties in our art, the fruits of new methods, new processes, and new apparatus were exhibited, and as they were mostly the productions of eminent scientific men and artists, an unusual degree of interest and importance was attached to them. A splendid portrait by Adam Salomon, "the photographic sculptor," as he styles himself, excited unbounded admiration. In a previous letter I have spoken of this artist's productions, so remarkable for their *sculpturesque* character. The portraits he produces are like relievos; a beautiful play and skilful management of light and shade, are the means by which this unique result is obtained, and serve, most forcibly, to show how much can be done, and how much power in effect, lies in the hands of the photographer who will take the trouble to master the principles of *chiaroscuro*. I have seen photographic portraits possessing some of the sculpturesque qualities of those by Adam Salomon, but they were the result of a fortuitous combination of circumstances, rather than the fruits of design or well directed intention. I am disposed to think, that now the chemistry of photography is so well understood, and so readily acquired, that the interest of the photographer lies in mastering the principles of chiaroscuro. That these principles are not generally recognised, and are understood only by a few thoughtful artists, is only too evident in the host of portraits submitted to our notice.

I must not omit to notice the great admiration that was excited at this meeting of our society by M. Silvy's collection of visiting-card portraits. Mr. Silvy has established his studio in your metropolis, and it is very gratifying to see how generously his taste and talent are appreciated. His collection appears to contain most of your notabilities of all conditions of men and women. We owe to M. Silvy the photographic copy of the Sforza manuscript I mentioned in my last letter.

A proof, exhibiting the progress made by M. Asser, of Amsterdam, served to give the meeting an idea of the capabilities of his process of litho-photography. The proof represented a copy of an engraving, extremely vigorous as a reproduction. The artist has in no respect changed his process, he pursues the same method he announced a year ago; but the present state of excellence has been arrived at through perfecting the manipulation by constant practice.

Several specimens of M. Sabatier's amphipositives were exhibited. They excited a very high degree of interest, both on account of the method by which they are obtained, and their artistic excellence. The process by which they are produced has been so recently described in the pages of the Photographic News, that I need not repeat it here; but I may direct the attention of your readers to it, with the view of their examining its peculiar merits, and of availing themselves of a process that gives them an opportunity of achieving novel results.

M. Fargier has patented a new printing process: but yet not entirely new, inasmuch as he avails himself of the photogenic action of light on a mixture of gelatine and bichromate of potassa, with the addition of carbon in powder. His method is based on a very simple but important fact, viz., that when a transparent sensitive medium is exposed to light, the chemical action and change commencing at the surface of the sensitive medium, penetrates more or less into its substance in proportion to the length of time it is submitted to the action of the light. Consequently, when he has obtained a picture on a layer of gelatine, containing powdered carbon in a state of suspension, and sensitized by bichromate of potassa, M. Fargier pours some collodion on to this picture, and then plunges the plate into warm water. The glass becomes detached, the gelatine melts, *under the image*, and there remains on the collodion only those portions of the bichromate, more or less thick, according to the intensity of the light, and which have become insoluble. In this way the picture is really transferred to the collodion in all its detail, for the surface remains exactly as the light has made it. The picture is next glued to a sheet of paper, collodion *uppermost*. In this way M. Fargier obtains positive pictures so fine in model and tone, that proofs taken from the same negatives by ordinary methods cannot be compared with them.

"Seeing is believing." I recently expressed some doubts as to the accuracy of some statements made with regard to photographic printing by steam. But as I have now seen the results, I can no longer remain incredulous. The operations are so rapid that four thousand impressions per hour, rather more than one per second, can be printed. Our ingenious American cousins have turned these remarkable printing facilities to a good practical account, for at the recent presidential election portraits of the candidates were extensively circulated among the "sweet voices," and in many cases deposited in the ballot boxes. To the anthropologist this application furnished an infallible means of estimating the moral character and the capabilities of the several candidates.

The new electric lamp of Professor Way has been applied to photography by M. Bingham. The results obtained by this mercury medium are very rapid, the exposure required being less than in daylight, and the pictures are unexceptionable.

The amplified positives exhibited by M. Disderi, obtained by M. Wothly's process, have excited raptures. The execution of these colossal portraits surpasses anything of the kind hitherto exhibited. I regret that the secret of the method by which they are obtained is likely to be kept, as M. Disderi has paid M. Wothly a large sum for it.

The superiority of steam over water, as an agent for extinguishing fire, is fully recognised in Prussia. A large sugar refinery has been fitted up with the requisite appliances to secure the application of steam to the extinguishing of a fire, should one break out on the premises. The apparatus consists of a series of wooden pipes, passing into all the rooms and offices of the establishment. The principal pipe, of four inches internal diameter, communicates with the boiler-house, and by means of a supply-pipe, communicating with the eight boilers, receives all the steam they engender, the quantity being regulated by a stop-cock. Vertical pipes, of 2½ inches internal diameter, branch out from this main supply-pipe, and they are conducted into the several rooms. Each of these branch pipes is also furnished with a stop-cock. If a fire should happen to break out in any part of the building, the steam-cock is immediately to be turned on, and also that one in the room wherein the fire is first discovered. The steam-pipes leading into the room above and that beneath, and also those in the passages, are turned on, while all communication with the external atmosphere is promptly closed. In a few minutes the largest fire may be extinguished, provided no communication with the atmosphere is left open. When it is considered that property in a burning dwelling is frequently, when the fire happens to be extinguished, damaged as much by the enormous quantities of water thrown into the building by the fire, the superiority of the steam method on that score alone, would be sufficient to entitle it to the preference over the ordinary clumsy and ineffectual mode adopted for extinguishing fires.

Proceedings of Societies.

London Photographic Society—*continued*.

Mr. Thomas prefaced and interspersed his paper on varnishing with some remarks, which were important. He stated at the outset his conviction that all cases in which the varnished film of a negative had cracked, it would be found traceable to some carelessness in manipulation. One very fertile cause of these cracks he believed to be the use of cyanide of potassium, and the consequent imperfect washing which was given to the negative, arising from the prevalent impression that cyanide required very little washing to remove it. He thought it could be proved that negatives would be found more permanent where hyposulphite of soda was used for the fixation, and that simply because every one knew the importance of thorough washing when hypo was used, and took the proper care that was necessary. He divided the modes of varnishing into the hot and cold. By the first, hot, he meant the use of spirit varnish, in which heat applied to the plate was necessary. Spirit varnishes were all pretty much of one class, and were composed in proper proportions of gums animi, sandarac, and copal dissolved in alcohol. They for the most part contained some water, and he had an impression that they would be better if made of absolute alcohol. The chief advantage of spirit varnishes were their hardness, and their chief disadvantages an occasional tendency to be tacky. They also interposed a layer of gum between the negative and the sensitive paper, which must to some slight extent detract from the sharpness. He had heard also of cases in which the image had been dissolved by their use. This he was disposed to attribute rather to some fault in the negative, such as superficiality of image, rottenness of the film, &c., than to the varnish. He recommended amber dissolved in chloroform. It might not be so hard as spirit varnish, where a thousand or fifteen hundred impressions were required from one negative; but he believed where it was made from pure amber it was the best in all respects. The amber should of course be pure; the test was its capability of producing succinic acid. Mr. Thomas here handed round a sample of amber chippings such as were used for the purpose of making varnish, and then proceeded to remark that varnishing should always be conducted in a warm room, as both cold and moisture were unfavourable to successful results. To secure perfect dryness he recommended the negative always to be slightly warmed a short time before, to drain off any moisture remaining in the film. Amber varnish should always be suffered to remain a short time on the plate, say twenty or thirty seconds, before pouring off, as a better coating was thus obtained. It was of the utmost importance to keep two bottles; one with a supply of clean varnish, ready for use, and the other as a stock bottle from which to filter fresh quantities. He might also mention that amber varnish was very easily filtered, with but very little loss from evaporation. He concluded by remarking that it was to Dr. Diamond that photographers were indebted for its first introduction.

Dr. Diamond remarked that there was an impure or spurious gum sometimes sold for amber, known, he believed, as Highgate resin, if the varnish were made of this gum it never got hard. The genuine amber was very hard; he had never seen a negative varnished with it damaged. It, moreover, had a great advantage in withstanding damp.

Mr. Hardwich confirmed Mr. Thomas's remarks as to the dryness of the film. It rarely became quite dry by spontaneous drying, and the application of heat before varnishing would generally drive off more water. The question as to the use of absolute alcohol for making spirit varnish was an important one. He remembered preparing some collodion for use especially with large plates. He, therefore, prepared cotton in very weak acids to get the utmost fluidity. It answered perfectly well, flowed freely, and gave no crapy lines; but when varnished the film dissolved. He attributed it to the use of absolute alcohol in the varnish, as he knew that pyroxyline prepared in very weak acids was soluble to some extent in absolute alcohol, which made it gummy. He thought a small quantity of water, say four or five per cent., in the alcohol, would prevent that action, and the question was, would that produce injury in any other respect, and he would be glad to know if a small per centage of water would have any injurious effect on the gums.

Mr. Thomas did not think that such a small quantity would make much difference, or cause any difficulty in dissolving the gums. The *vernis Sœhnée* was not made, he thought, of absolute alcohol. The effect of water would be to make the varnish a little thicker and more glutinous, and he thought the thinner it was the better, because it would less interfere with sharpness. Unless it could be shown that absolute alcohol had a tendency to injure the film he should much prefer its use.

Mr. Sebastian Davis referred to some varnish imported from France which removed the film entirely from the glass. He believed that it was made of highly rectified alcohol, and it was recommended that if it were found to have any effect on the film, the stopper should be left out of the bottle a short time, he presumed for the purpose of allowing it to absorb a little water from the atmosphere.

Mr. Samuel Fry stated that recently looking over a box of large negatives, 18 inches by 15 inches, he found two of them hopelessly destroyed by cracks in the film. He was unable to say with certainty what varnish had been used on them. It was not the Sœhnée varnish, with that he had never found any kind of trouble.

A Member said that he had had the film dissolved, but never with Sœhnée varnish. As regarded cracking he had found that to proceed from keeping the negatives in a damp place. He quite agreed with Mr. Hardwich, that the film which had been suffered to dry spontaneously always retained some moisture. It would be found very easy to remove the edges of the film, when that was required, from plates so dried; but if the film had been dried by means of applied heat it was almost impossible to remove it.

Mr. Williams had found that a mixture of absolute alcohol and alcohol 60 over proof, so as to produce a specific gravity of about 817°, was the best strength of solvent for a spirit varnish. He did not agree with Mr. Thomas as to the gums most suitable for the purpose; he thought lac was a most essential element. The bleached lac should be used, which should be powdered and dried before dissolving. In making amber varnish it was of the utmost importance that pure chloroform should be used. Methylated chloroform, or chloroform containing alcohol, never answered the purpose. Pure amber was of equal importance, the sample which Mr. Thomas had exhibited contained a great deal of black amber, and was a sample that he should have rejected, as he preferred nothing but the pure white amber. Some makers had been in the habit of using a mixture of chloroform and ether in making amber varnish, but he had found that varnish so made was very liable to crack. Another solvent for varnishes which had not been named and which possessed many advantages was benzole. It was very important indeed to have it pure, so that on evaporation it should leave no residue. Much of the ordinary benzole was contaminated with coal-tar oil. If pure, however, it made, with gum dammar, a very good varnish; but he thout nothing so good for photographic purposes as a spirit varnish properly made.

Mr. Fry agreed with Mr. Williams as to the value of dammar dissolved in benzole. Its chief fault was a tendency to bloom.

Mr. Quin said he had used some gallons of the Sœhnée varnish, and had never had any defects that were not clearly traceable to moisture. If the plate were damp when varnished, the film shrivelled up in some places and finally cracked.

Mr. Bedford had had some films spoiled by cracks of honeycomb form. They had been varnished with spirit varnish and printed from. He had not had any crack with amber varnish; but he did not find it hard enough. He sometimes recoated with spirit varnish after amber varnish, and never found any crack which were so treated. He would be glad to know if there were any means of arresting the cracking after it had commenced, for when it had begun on one part of the film it generally spread.

Mr. Quin had met with the honeycomb cracks. He thought it important not to heat the plate too much before applying the varnish, a gentle heat was sufficient.

Mr. Bedford always applied a greater heat in varnishing than he thought it was likely the film would be subjected to from the rays of the sun.

Mr. Hughes remarked that in selecting the varnish some consideration should be given as to the character and purpose of the negative. Some were only required for temporary purposes, whilst others were choice negatives from which a large number of prints were required. For temporary purposes amber in chloroform was doubtless the easiest to use. The next easiest was benzole varnish, commonly known as crystal varnish. The most difficult to use were the spirit varnishes. Under that general head varnishes with a variety of gums were made, each maker using his own formula. He believed the basis of all spirit varnishes was lac in greater or less proportion. There was one spirit varnish that was getting widely into use and he believed generally with the best results; he referred to the Sœhnée varnish. This was made by an old and respectable French house, who had a standing for varnishes long before photography was known. This offered the guarantee of a continuous supply of a good article, and it could now be obtained of most dealers, as they imported it direct. He had had some experience with varnish made from dammar dissolved in benzole, and would not recommend it.

Dr. Diamond said he believed he was the first to use the Sœhnée varnish in this country. It was originally intended for varnishing leather. and was manufactured by *Sœhnée Freres*, from a recipe by Dr. Ure.

Mr. Quin had made some experiments to ascertain its composition, he found it to consist largely of white lac in combination with some other gums.

Mr. Vernon Heath had never heard of any case in which the Sœhnée varnish had cracked, and asked Mr. Bedford if the spirit varnish which he had described as cracking was the Sœhnée varnish.

Mr. Bedford believed not. It was a spirit varnish he had from Mr. Thomas.

Mr. Thomas had been prepared for much variety of opinion on this subject. In regard to the Sœhnée varnish there was a case mentioned recently in the Journal where it took the films off the plate. There was one point he thought, worth calling attention to, which he thought would have the effect of preventing some splitting of films; that was the neat method of taking off a portion of the film all round the plate. If there were any tendency to contract, it then commenced at once. As to the manufacture of spirit varnishes, there was no mystery in it; it was merely a question of judgment and experiment as to selection and proportion of gums, which anyone could try for himself. The gums he had mentioned he believed to be the best: as for lac he had never found it make a hard varnish. The use of a mixture of ether and chloroform, which had been alluded to as a solvent for amber, appeared to him so insane and ridiculous that he could not conceive how anyone had thought of it. In regard to the colour of the sample of amber he had shown, he might simply say that he had taken the trouble to try each colour, and found no difference whatever in the result. As to dammar in benzole, he had tried it, but was unable to get a varnish free from tackiness. He would now state a few results which he had collected, referring to hundreds or even thousands of negatives. He had called on Mr. Kilburn, who had some thousands of negatives. For varnishing he used nothing but amber in chloroform. The only cases of cracking he had had were clearly attributable to carelessness. He used hypo only for fixing, never using cyanide. He washed very freely, and allowed the plate to dry spontaneously, warming before varnishing, so as to drive off any moisture which might remain in the film. Of course, when this was done the plate was suffered to cool again before applying the varnish. He next called on Mr. Herbert Watkins. He had used all kinds of varnish, and had some thousands of negatives; he fixed with hypo and washed very thoroughly, and never had had one cracked film. He then called on Mr. Claudet. He had been in the habit of using amber varnish for some years, until last year he found two or three negatives with signs of cracks, in the form of segments of circles. He then sent for some spirit varnish which he had used. The majority of the plates so varnished were safe, but one or two showed signs of cracking. He then visited Mr. Melhuish, and he had never had a single crack. He was not particular what varnish he used, but preferred the amber in chloroform. He always used hypo for fixing. Now Mr. Claudet fixed with cyanide, washed rapidly, dried with artificial heat and varnished at once. He thought all this proved that where hypo and thorough washing was used, and at the same time sufficient care taken to have the film dry before applying the varnish, there was no danger of cracked films; and that where cyanide was used, and hasty washing afterwards, great risk was incurred.

Mr. Williams washed to remark that pure cyanide of potassium had no action on the collodion film; but some commercial samples were often adulterated with carbonate of potash, which might render the film tender.

Mr. Thomas had not intended to intimate that it was the cyanide which was injurious; but the small amount of washing which generally followed it.

Mr. Hardwich begged to suggest as a subject for discussion at the next meeting, the preparation of paper for use with the alkaline gold toning process.

The Chairman said he had already a paper to announce on Lunar Photography, by Mr. Samuel Fry.

After some conversation on the subject, it was agreed that the paper by Mr. Fry should be taken at the next meeting, and one by Mr. Hardwich on the subject he had suggested, at the meeting in February.

After the usual votes of thanks the proceedings terminated.

Photographic Society of Scotland.

The second meeting of the season was held in George Street Hall, Edinburgh, on Tuesday evening. Mr. T. B. **Johnston** in the chair. A paper was read on "The Macnair Dry Collodion Process," by a Member of Council. This process, which was discovered last year by Mr. Macnair, of Moray Place, a member of the society, and for which the society's medal was awarded him, has been very successfully practised by several professional and amateur photographers, who pronounced it to be the best dry process yet discovered. Certain difficulties attend it, however, the chief of which is the tendency of the film on the plate to rise in blisters and peel off. This the author of the paper considered to be caused chiefly by using a collodion of a character similar to that preferred in the wet collodion process. Instead of this he found a collodion giving a dry and powdery film, or what is commonly known as a *rotten collodion*, to be the best. A strictly neutral nitrate bath was also to be preferred, and the washing of the plate in water during its preparation should be continued till all appearance of greasiness had disappeared—more than that causing a feebleness in the resulting picture, although perhaps it may increase the keeping properties of the plate. The preservative solution of malt he found should not be of the strength originally recommenned by Mr. Macnair; 2 oz. of malt to 10 oz. of water being sufficient; and it was not necessary to to coat the plates with it more than once to ensure their keeping perfectly sensitive for many weeks if kept in a dry place. In developing, it was very essential to wash the plate very thoroughly before applying the developing solution, so as to remove the last traces of the malt coating, otherwise stains and marblings would appear on the plate. Pyrogallic acid was recommended for the developer in preference to protosulphate of iron, and hyposulphite of soda in preference to cyanide of potassium, for fixing the picture.

A lengthened and interesting discussion followed, in which Mr. **Orange**, photographer, said that he had used the Macnair process very largely for the last twelve months; and although there were considerable difficulties connected with it, he had now arrived at great certainty in working it.

Some facts in connection with positive printing were brought forward by Mr. Tunny, of which we hope to give details next week.

On the conclusion of the stated business the meeting unanimously agreed to present the society's silver medal to their late honorary secretary, Mr. C. G. H. Kinnear, as a mark of their appreciation of his valuable services to the society, and as being the inventor of the much-approved form of portable camera, which now bears his name.

Architectural Photographic Association.

The fourth annual meeting of this association was held at the Galleries, Conduit Street, on the afternoon of Wednesday, the 12th instant. **Edward I'Anson**, Esq., treasurer of the association, presided, in the absence of the president, who was not in town.

The minutes of a special general meeting held last year having been read and confirmed, the report of the committee for the past year, together with the balance sheet, was brought before the meeting.

The following are the principal portions of the report:—

In coming before the subscribers at the completion of the fourth year's operations, the committee have the pleasure to report, that, in spite of the many difficulties which stood in their way last autumn, and the lateness of the season, an exhibition in no way inferior to those of former years was held at No. 9, Conduit street, the Home of the Architectural Societies. One evening in each week during the Exhibition, Messrs. Donaldson, Fergusson, and Burges were kind enough to read papers on subjects connected with the Photographs. Illustrated catalogues have been, as before, supplied to the Honorary Sectaries for the use of those Subscribers who were unable to visit the Gallery.

The Committee would refer with much satisfaction to the opportunity which has presented itself during the past year of lending portions of the collection of Photographs to local Art Exhibitions in Birmingham and Devonport—the thanks of the Committee being due to Mr. J. T. Brown, jun., and the Rev. E. B. Hutchinson, Hon. Secretaries, for their energetic assistance in the matter. Negotiations are pending with the same view in other towns, which will tend to promote the objects of the Association; and it is gratifying to observe that the local papers appear to appreciate highly the advantages thus conferred by this Association.

A Sub-Committee having carefully examined and valued the whole of the stock of Photographs, amounting to about 1,300, and having selected more than 500 to be retained in conformity with Clause No. 2 of the Objects of the Association, the Committee are prepared to dispose of the remainder at a very moderate rate to Subscribers for the current year, Schools of Art, and similar Educational Societies. The Photographs will be open to inspection on application to the curator, Mr. Moody, at 9, Conduit street, W. The uncertainty so publicly expressed last year as to the continuance of the Association, the partial derangement of its operations, the late period at which it opened, and the short duration of the Exhibition, held in a new locality, naturally operated prejudicially, as is made manifest by the great diminution of the number of Subscribers from that of the year 1859. But the Committee confidently hope, from the numerous expressions of satisfaction which have been received, that Subscribers will be induced, by the excellent quality and the extremely small cost of the Photographs issued, to assist, by drawing the attention of their friends to the advantages offered by the Association. As the larger the number of Subscribers, the smaller the proportion of expenses to receipts, and consequently the greater advantages to each individual Subscriber.

A large number of Photographs having, hitherto, at each distribution, been left in the hands of the Committee by Subscribers selecting but omitting to pay for them, the Committee hereby give notice, that all selections will be considered void if the amounts due for them be not paid before the close of the Exhibition. To photographers the advantage of working with the Association are becoming more and more clear, as is made evident by their constantly increasing desire to exhibit.

The forthcoming Exhibition, which will open on the 15th of January, will, it is anticipated, be an unusually interesting one—many artists having taken objects expressly for it; and it has been sought, by inviting suggestions for the works which shall form the subject of photographs, and by directing the attention of photographers to these subjects, to advance as much as possible the practical character of the subjects exhibited.

From the balance sheet it appeared that, taking the large surplus stock on hand at the minimum amount, it might be expected to produce, if realized, there was an estimated balance in favour of the Association of £181 19s. 9d.

The report and accounts having been received and passed, a conversation ensued, in the course of which it transpired that it was imperative for the pecuniary well-being of the society that powers should be given to the committee to dispose of the large surplus stock of photographs belonging to the Association, which they intended to offer on very low terms to schools of art and educational institutes generally. They had had in the year 1858–59 about 1200 subscribers, whereas, owing to proceedings at the meeting twelve months ago, the number of subscribers in the year 1859–60 was only 500, which caused the expenses to bear a greater proportion to the receipts, and rendered some steps necessary for improving the financial position. For this purpose disposing of the large surplus stock was proposed. This done, a general impression obtained that the Association would be in a flourishing state.

A resolution, empowering the committee to sell the surplus stocks in hand as proposed, was then moved and carried.

A resolution, confirming the appointment of Mr. George Truefitt as auditor, in which capacity he had been acting since the death of Mr. G. Bish Webb, was then passed, as was also one suggesting a modification of one of the rules.

The following gentlemen were then elected or re-elected to serve on the committee:—Messrs. Morgan, A. J. Baker, George Truefitt, J. P. Seddon, Roger Smith, and W. S. Barber. Mr. Beresford Hope was also elected as a third trustee. Messrs. Christopher and James were elected auditors for the ensuing year.

Votes of thanks to Mr. F. C. Penrose, honorary foreign secretary to the Royal Institute of British Architects, for services rendered to this Association to the various officers, and the Chairman—terminated the proceedings.

Photographic Notes and Queries.

Experiments in Washing.

December 3rd, 1860.

Sir,—I was much struck by the efficacy of a long continued downward current of water in purifying a bath, the tendency of which to throw up an oily film I had for many weeks been endeavouring to cure by ordinary means; and I had prepared a letter to you, recommending that, in washing positives, they should be fixed on light open frames, and be placed *vertically* in baths through which a downward, or upward, current should be maintained. I tried to show that to place positives in a large pan, or vessel, to allow them to lie horizontally, and then to make a current of water pass through it, was comparatively useless. I tried to prove, arguing from the analogy of the action of currents of rivers passing through bridges, and of steam-vessels passing rapidly through water, that the positive floating, or lying horizontally in water, is but little affected by a downward current—while, if placed vertically, that every portion of its surface would be acted on, not only by the dissolving power of the water, but also by its friction. I tested this theory practically, and *have failed.* Notwithstanding my old recollections of the difficulty of removing a wash of prussian blue in water-colour painting, I steeped a sheet of albumenized paper in water deeply tinted with prussian blue for about two hours, having dried it, I cut it into two, and pinned the edge of one half to the edge of a flat ruler, and inserted it into a new bath, of about 15 inches depth. (The slip was completely isolated from the sides of the bath.) A current of water was then made to pass through the bath by a tap and syphon (reaching to the bottom of it), so regulated as to keep it always full; the water passed through it at the rate of 80 pints per hour, and the current was kept in action for 14 hours.

On examining the slip I found, much to my disappointment, that I had failed to remove as much of the colour as I had expected, nay, worse, when I placed the slip between sheets of blotting-paper much of the colour came off; consequently, it must have been lying loose on the surface. I then used a sponge, lightly, and removed much of the colour. I send you the slip so treated.

I have failed to this extent, I expected more effect from the friction of the water, in removing the particles of the prussian blue.

Prussian blue is insoluble, but infinitely divisible in water; had it been a substance solublei n water, I feel confident that I should have removed every particle of it; each as it dissolved would have been carried off, whereas, in the case of the prussian blue, which has a great affinity for water, a "varnish" of water was formed, over which the current glided, without affecting the loose particles on the surface of t he paper, but they adhered at once to the blotting-paper in which the slip was placed.—I have the honour to be, sir, your obedient servant, N.

Suggestion for a Dry Process.

Fareham, Hants, December, 1860.

Dear Sir,—A week or two since I prepared a collodion plate in the usual way, washed it, and immersed it in a mixture of hydrochloric acid 3 drops, water 1 oz., allowing it to stay in this acid bath for ten minutes, it was then dried and kept for four or five days, exposed then about half as long again as for a Fothergill plate, immersed in a bath of nitrate silver 10 grains, water 1 oz., and developed with iron, resulting in an over-exposed picture. I fancied by using hydrochloric acid I should get a plate with no soluble chloride at all. May not plates be prepared thus without a preservative? I have not time or opportunity to do any more just now, or should try again. I made use of Le Gray's formula for toning, published in a recent number, and have obtained very capital results on two prints which were completely obliterated in all but the highest lights, and certainly were of no use for the alkaline gold bath. Have you noticed, in preparing Fothergill plates, the electric spark? When giving them the last two or three rinsings in a porcelain dish, it is plainly visible (in the dark) in the centre of the dish; I invariably see it, but only on a coated plate.—I am, dear sir, yours respectfully, W. B. B.

Photographic Nomenclature.

Sir,—A gentleman at a late meeting, expressed some compassion for the French, whose equivalent for our "camera" is "une chambre noire photographique." Our neighbours are fond of appropriating Greek words, and will probably feel obliged if he suggests for their adoption "une photociste" (φωτος κιστη) as a simple substitute for their compound. I admit that it is not a very literal translation of the "chambre noire," but it is more appropriate. Your obedient servant,

N.

The Albumen Process.

Glasgow, Dec. 8th, 1860.

Sir,—Permit me a few lines to set myself right with your readers regarding a paragraph in a letter subscribed "An Amateur," which appeared in No. 117 of the Photographic News. "An Amateur" there says, "I do not think Mr. Cramb, who works by the old albumen process, has anything new to communicate beyond what is known to those who pursue the method now under discussion. When he publishes his method of manipulating we shall see." The impression this paragraph is calculated to produce seems to me something like this, as if, indeed this far-seeing amateur had said: "Don't be hoaxed, gentlemen, this Mr. Cramb is a humbug, I know him and his albumen process, and there is nothing new in it." I think, Mr. Editor, I have to thank you for this favour. The only notice of the fact that I did take pictures by the albumen on glass process in the Photographic News, or indeed in any journal, till last week, was from your own pen, and about the insertion of which I was not consulted or aware of its being to be, till I saw the journal. When I gave you the information you placed before the public in your courteously expressed note, I told you I had doubts if, after all, there was anything very novel in the manner I had fallen into of taking pictures by this old but little practised process. I have not sought publicity. Nor have I have boasted the merits of my plan of manipulating. The *fact* expressed in the paragraph I do not complain of. It may be true there is nothing new in my process, what I object to is the impression it conveys that I had led you or your readers to believe there *was something new* in it. But how, may I ask, has "Amateur" got his information. I have never made any secret of my formula and manner of operating, yet so far as I remember no one has ever happened to get even an outline of my method, with a very few exceptions, and I could not believe any of those who are sufficiently intimate with me to know really how I work, could perpetrate such a letter as that of your correspondent. So that I am forced to the conclusion that this amateur must be a spirit-rapper, or be gifted with the second sight, since he volunteers information which he cannot have acquired in any ordinary channel.

I am perhaps wrong to feel this little piece of impertinence so keenly, since it reflects perhaps more highly on yourself, sir, than on me, as you intimated in your journal that you had communicated with me regarding the publication of my process, which this "Amateur" assures you and your readers would be quite worthless—what could be more so than a process in which there was nothing new. And yet "Amateur" expects the process is to be published, for he says "we shall see." See what? See how foolish he was to hazard an opinion on a subject of which he knew nothing, as Mr. Cramb's process is yet substantially unknown.

I have to apologise for occupying so much of your space with a matter so purely personal, but I felt I could not pass over so offensive an insinuation as the paragraph of your correspondent conveyed.

In conclusion, permit me to say that perhaps after all there is something new in my process, or that its publication, which will be this winter, may be useful in inducing many to give the oldest dry process at least a trial.—Yours truly,

John Cramb.

[The first allusion to Mr. Cramb's process emanated from ourselves, and arose out of a conversation we had with Mr. Cramb in London. A gentleman who introduced us to Mr. Cramb remarked that he (Mr. Cramb) used the old albumen process, and found it more sensitive than the usual dry collodion processes. In the conversation which followed, Mr. Cramb remarked, that his modification of the old process was very slight. In a subsequent number of the Photographic News we referred to the fact, in a brief paragraph under the head *Talk in the Studio,* a column devoted to such scraps of photographic or artistic intelligence as we deem interesting to our readers. Mr. Cramb certainly made no boast of the matter, nor solicited notice. We deemed the matter of sufficient interest not only to insert the notice, but to comminicate with Mr. Cramb subsequently, to induce him to allow us to publish his process, and were led to hope that he would at some time do so. Until this is done all comment is foolish, because it can merely be conjectural. The remarks made by our correspondent "An Amateur," last week certainly possess somewhat of a slighting tone; but we think that Mr. Cramb overlooks the fact that "Amateur" merely asserts that he does "not think" there is anything new in Mr. Cramb's method, and as he does not give any grounds for thus thinking, it of course just passes for as much as such a thought is worth. We shall have much pleasure in publishing Mr. Cramb's process at as early a period as may seem to him right.—Ed.]

Transferring Phenomenon.

Sir,—The other day I was going to transfer a collodion positive to leather, and as the leather was rather rough I was doubtful of success. I took an old positive which had stood in the smoke for about six weeks amongst dirty glasses. I tried the leather on it, after coating with spirits of wine; fancy my astonishment when on taking away the leather I had a beautiful portrait on it, and another, the same, still remaining on the glass.

Both portraits were as perfect and pure in the whites as the day it was taken taken, although the glass was as black as ink before I transferred it. As I have never read or heard of any similar phenomenon, perhaps this hint may be useful to some of our experimentalists. Clydesdale.

Bad Albumenized Paper.

Sir,—Allow me to warn photographers through the medium of your paper, against purchasing cheap albumenized paper without first trying it. A few days since I answered an advertisement of "Eight quires of highly albumenized paper for sale, at 5s. per quire." I requested the advertiser to send me a sample—inclosed is a scrap of it for your inspection. I think you will agree with me that there is not a particle of albumen used in its preparation, but some gum or gelatine which may readily be washed off with a sponge.

I sensitized a portion in a *new* bath, which became blood red, and the paper turned a dark yellow before it became dry. A moment of exposure would produce a darker or better print than the enclosed, although the bath contained 100 grains of nitrate of silver to the ounce, and the negative was a very weak one. Further comment I feel would be unnecessary. I remain, sir, your obedient servant, B. Jones.

Cheltenham, *Dec.* 11*th*, 1860.

[Where a sample of anything is forwarded, there need not be much danger of victimization. In most cases we strongly deprecate the rage for so-called cheapness, which has been the bane of photography for the last few years. As a rule you may fairly conclude that nothing is offered below its *value*; and where, except under extraordinary circumstances, articles are offered at much below the market price, it is because they are below the market quality. We see no reason, however, to doubt that the sample you send is prepared with albumen: the use of gelatine or gum would not account for the facts you state. It is probably very old albumenized paper, partially decomposed and quite useless.—Ed.]

Cloth for Backgrounds.

Sir,—There has been much said and written about backgrounds suitable for photographic portraiture, much of which information would be acceptable to photographers generally. But there are still a few remaining who cannot make such articles to please themselves, or would prefer to buy them ready made. Will you be kind enough, through the medium of the Photographic News, to enquire if any of your subscribers can inform me where such an article is to be got. Those I have seen are generally calico, done over with distemper colour (such as is used for the walls of rooms) various tints of course, according to the taste of the artist. Some are done in oil colours, but they are seldom clear of the oily glaze that is so very objectionable. It occurs to me that if some cloth manufacturer would take the affair in hand for us, he would find it pay him to make and sell such an article, for the distemper backgrounds are objectionable, as they are liable to stain with wet, or crack if not carefully used; perhaps something of the stuff or calico kind would answer if carefully wrought in the loom, and of course taking care to make no creases in folding it up to send to the purchaser; winding it on rollers for safety of transmission, &c. Yours respectfully, William Sturgeon.

[The material of most suitable width for backgrounds is sheeting calico. This it is probable might be dyed to any suitable colour. We have used several kinds. Those coloured in distemper are objectionable because so easily soiled and marked. We have had an excellent one painted in oil and "flatted." Brown paper can be had a yard and a half wide and any length; this pasted on to canvas, managing the joins neatly, answers very well.—Ed.]

Miscellaneous.

The Value of Coal-Tar.—It is but a few years since coal-tar, the product of the distillation of coal to extract gas, was deemed worthless, and thrown away in large quantities. It was finally ascertained that it possessed good qualities as a coarse paint for iron, and a little of it was used for that purpose. The chemists were at last led to examine this apparently worthless article, and see what could be made from it. The results of their investigations have been astonishing. From it are now extracted an oily substance, which, under the various names of coal-oil, kerosene, &c., is largely used for illuminating and lubricating purposes: a pure and beautiful, almost transparent, wax-like substance, known as paraffine, from which are made the finest of candles; a fluid, benzine, which possesses extraordinary properties as a solvent of oils, and many medicinal virtues; a still more subtle essence, the mirbane, whose extraordinary powers are but partially developed; a purple dye, of moderate cost but permanent colour: two shades of crimson and purple, known as violet and carmine aniline, one of which is the popular and beautiful *Mauve* or *Magenta*, so generally worn by the ladies of the present season; and, finally, a rose fuchsine, a colouring matter of the hitherto matchless tint of the fuchsea, so precious that no previously known colour equals it in price. The following list of prices, at which those various products are sold in Paris, indicates what stores of wealth the chemist has found in this once valueless article:

	Per lb.		
Coal, less than	£0	0	0¼
Coal-tar	0	0	0¼
Crude oil	0	0	1
Refined oil	0	0	5
Benzine	0	0	10
Crude nitro-benzine	0	2	4
Nitro-benzine rectified, or the essence of mirbane	0	4	0
Common aniline	0	15	0
Violet and carmine aniline	1	5	0
Rose fuchsine, pure and in powder	66	13	6

The last is equal to the price of gold. And so, says M. Parisel, from coal carried to its tenth power, we have gold; the diamond is to come.

Sunlight in Houses.—The following fact has been established by careful observation: that where sunlight penetrates we are less liable to sickness than in a house where the apartment loses its health invigorating influences. Basement rooms are the nurseries of indisposition. It is a gross mistake to compel human beings to reside partially underground. There is a defective condition of the air of such rooms, connected with dampness, besides the decomposing paint on the walls, and the escape of noxious gasses from pipes and drains. All schoolrooms especially should be open to the sunlight, yet, as a general rule, they are darkened like a parlour.

Cadmium is a metal which is but little known in the general arts, and there are comparatively few persons who have seen it. It is white in appearance, like tin—very ductile and malleable. It fuses considerably under a red heat, and is nearly as volatile as mercury. It is found in minute quantities associated with zinc; and in the distillation of zinc ores it comes over among the first products, owing to its great volatility. Cadmium forms several definite alloys; it unites with platinum and copper at a red heat. It is soluble in the powerful acids, especially nitric.

Cleaning a Gutta-percha Bath.—A correspondent informs us that having purchased a new gutta-percha bath holding 100 ounces, he found it a most difficult task to get it clean. Having filled it several times with a strong solution of carbonate of soda and of potash, as we had recommended, filled with water and changed it daily upwards of a score of times; he still got an oily scum. Finally, he writes to say that he finds the error to be in his mode of applying the cleansing agents. He had only *steeped* it with the solutions, but had not *washed* the bath. He has succeeded by proceeding as follows:—He filled the bath with the *same soda solution* which had *previously failed*. He then inserted a syphon, which reached nearly to the bottom of the bath, and placed it under a tap, so turned that the influx and efflux were nearly equal. He kept it there for nearly 12 hours. The soda solution might have, more or less, affected the current for an hour or two, for the remaining time probably only fresh water passed through it. It has since twice filled for periods of 24 hours, and no scum has appeared.

Methods of Preserving Wood.—The methods of effecting this may be summed up as follows:—1st. Sealing up the pores by varnishes or paint. 2nd. Disposing of the sap by soaking in water, heat, or chemical agents. 3rd. Filling up the pores of the wood with some inorganic substance which will exclude the air and moisture. Wood for pianos and some other musical instruments is sometimes seasoned by exposing it for six weeks, in a chamber heated to about 150°.

Talk in the Studio.

The Shakespeare House Committee are compelled again to appeal to the public for subscriptions. The late John Shakespeare's grant for its repair and preservation having been declared invalid by the Court of Chancery under the act of Mortmain. The heavy sum so freely subscribed by the public some time since was swallowed up by the exorbitant demands of its former proprietors. Surely the cause this committee pleads for will itself ensure success: such a relic must not be lightly lost.

The Panoramic Lens.—Mr. Ross has, we understand, expressed great satisfaction with the result of an examination of the capabilities of Mr. Sutton's panoramic lens, and is about, we believe, to undertake its manufacture for the future. We may hope that in such hands its utmost powers will be developed, so far as they depend on skilful and careful attention from the practical optician. The Belgian and French patents for this lens have been purchased by Herr Liessegang, editor of the *Photographisches Archiv*, and German Correspondent to the Photographic News.

A New Solar Camera.—We are informed by Herr Liessegang, that he has recently invented a new form of solar camera, having a twenty-inch condenser, from which the most perfect and rapid results are obtained. He contemplates patenting it in this country.

Dr. Hill Norris's Dry Plates.—We exposed one of the extra-sensitive dry plates of Dr. Hill Norris recently with somewhat remarkable results. The morning was fine, and we had hoped to try an instantaneous effect. By the time we were able to expose, however, the sky was overcast, the atmosphere thick and misty, and a slight rain. One half of a stereo plate we gave, under these circumstances, an exposure of about twelve or fifteen seconds with one of Dallmeyer's stereoscopic portrait lenses, and the other half five seconds. The first we developed with pyrogallic acid, and obtained a faint poor image. The half with five seconds exposure we developed with iron, and got a much more intense and brilliant image than that with fifteen seconds developed with pyro. The experimental committee of the South London Photographic Society will, we believe, detail some interesting results with these plates at the next meeting.

Photographing on Sundays.—A case which excited a great deal of interest was heard recently before the City Police Court. In consequence of complaints made by persons living in King William Street, a policeman went on Sunday morning to the house of a photographer, named Henderson, in that street, and found him taking and selling likenesses, upon which Henderson was charged under the statute of Charles II. for exercising "worldly labour, not being work of necessity or charity," on the Sabbath. Mr. Beard for the defendant, admitted the offence, but contended that the police were wrong in the manner of obtaining the information. Alderman Salomons fined Henderson a shilling and costs; but said the police were not justified in going to anybody's private house to see whether work was being done on Sundays.

Punch's Anticipations.—"We expect," *Punch* remarks in a recent number, "to see very shortly houses opened all over the country at which will be held out the following refreshing announcement, 'A Glass of Ale and a Sandwich, and your Photograph for fourpence!'"

Photography on Ivory.—Mr. Bingham recently communicated to *La Lumière* a very simple and satisfactory method of photographing on ivory. First take a glass collodion positive by the common method; then transfer it to ivory, and dissolve the collodion with a mixture of collodion and alcohol, (the latter in excess). The impressed parts only remain upon the ivory, and the picture can then be easily coloured. [A *transparent* positive is here referred to, we presume.—Ed.]

The Camera of Horrors, Mr. Rejlanders paper with this title announced for the last meeting of the Birmingham Society, was, we understand, postponed until next meeting.

PHOTOGRAPHIC MEETINGS IN DECEMBER.

South London	Thursday, 20th.
North London	Wednesday, 26th.
Blackheath	Monday, 17th.
Birmingham	Tuesday, 25th.

To Correspondents.

F. L. G.—Page 52 of the Almanac, which you quote, is on carbon printing. We do not find the allusion to which you refer. Please be more explicit.

C. G.—The cause of the yellowness in your picture is the use of the old hypo and gold bath. Abandon it without hesitation and use the gold alone for toning, and the hypo alone for fixing. We have given formulæ several times lately. The indistinctness between the two pictures is caused by one slightly overlapping the other. A concentrated solution of pyrogallic acid may be made in acetic acid, and will then keep some time; but it is better to use it fresh.

L. A. D.—We believe it is customary to place the picture between two metal plates; but we have no practical knowledge of the method of hot-pressing. In London it is a distinct trade, and photographers can get their pictures rolled at the rate of a penny apiece, or less. We can give you no idea of the value of a second-hand camera without seeing it. Remember the old adage "the worth of a thing is as much as 'twill bring." You may constantly see quotations in our advertising columns.

Juvenis wishes to know "why a collodion film should *always* peel off on the application of bi-chloride of mercury and hydrochloric acid solution, used to intensify a feeble negative?" In the first place we do not know that it always *does* act in this way; but the fact that it often does should be a sufficient reason for avoiding, as much as possible, its use. The acid has a tendency both to loosen and rot the film, and should not be used with the mercury. See details of a much better method of intensifying in the Photographic News Almanac, and in former numbers of the News.

Clipson Wray.—You reason strangely; we state that we have long been familiar with a formula and disapprove its use for a given purpose. You doubt this long familiarity because you do not find the formula in the pages of the News at any time. Would it not have been odd if we had given a formula of which we distinctly state we do not approve? As, however, we do not doubt your good faith we will communicate further by letter.

N. Cann.—The causes of the film cracking in drying are various; but the most common arises from faulty collodion, being either too contractile or being made with weak spirits, and thus having an excess of water. A dirty plate is sometimes the cause.

A Welsh Ignoramus. You miscall yourself: a series of intelligent questions certainly dont prove ignorance. We will answer your questions seriatim. 1 See table of distances in Photographic News Almanac just published; but you are surely in error in speaking of your half plate portrait lens as of eleven inches focus. A much shorter focus would be more convenient to use for the purpose. 2 The resulting picture from a negative will be a transparent positive, if on glass, an ordinary positive if on paper. Glass plates with any sensitive coating you please, or paper prepared for printing by development. 4 The exposure would entirely depend on the process, the light, and the amount of enlargement. We enlarged from a small negative a few days ago to produce a transparent positive about twice the size; with one of Dallmeyer's stereo lenses and a wet collodion plate, the time required on a dull December day was three minutes. 5. Much will depend on lens and light: such things are best ascertained by experiment in each especial case. In the case mentioned we used none. 6. From a transparent positive on glass, you will obtain by a repetition of the process, a negative. You can commence with a transparent positive if you choose; but it is a good plan to enlarge by steps; thus if you wish to enlarge a small negative four times: first produce a transparent positive enlarged double its size: and from that positive produce a negative again enlarged to twice its size again. We some time ago had a promise from Mr. Jones of some further account of his photographic rambles in Wales but have not heard from him recently.

Geo.—Much of the information you desire is given above. If you do not wish to produce enlarged pictures of a size exceeding twelve or fifteen inches, you will find it easier to produce an enlarged negative on glass and print from it in the usual manner. You will find a series of articles on the calotype process in the first volume of the Photographic News. In enlarging it is always better to reverse the lens so that the front shall be turned to the enlarged image; but it can be used, with less chance of perfect results, without reversing. You will easily find the distances required for any special case by an application of the principles in the table as explained in the remarks appended to it. It will be better for you that you should spend a little time in understanding and applying those principles, than that we should apply them for you.

S. R. G.—Mr. Lake Price's address is St. James's Terrace, Harrow Road.

J. P.—You can carry the development in printing transparencies just to such point of intensity as you may desire. In some cases it will be desirable to develop as much as four negatives.

M. A.—Albumen has always a tendency to give an intense picture, and adds to the vigour of either negatives or positives on paper. In the latter case it adds to sensitiveness; but not in the collodion process.

A.—In portraiture the best point to focus is the eye. If that be sharp the rest of the face cannot be far out.

Several articles in type, and some correspondence are compelled to stand over until next week.

⁂ Our Correspondents will aid us in our endeavours to solve their difficulties if they will in all cases state details of their operations when failures occur; and when referring to former articles in the News giving the exact reference. Letters intended for the Editor should be addressed expressly to him.

Advertisements and Communications for the Publisher for the current number, to be addressed to the Office, 32 Paternoster Row, not later than 3 o'clock every Thursday. Post-Office Orders are to be made payable to Mr. Thomas Piper, at the Money-Order Office, St. Martin's-le-Grand.

All Letters, Works for Review, and other Communications for the Editor, should be addressed to the Office, 32 Paternoster Row, London.

THE PHOTOGRAPHIC NEWS.

Vol. IV., No. 120.—*December* 21, 1860.

VARNISHES AND VARNISHING.

One of the most annoying circumstances that can happen to a photographer is the destruction of a fine negative. Vexations at all times, even where it is the result of carelessness or unavoidable accident, it becomes irritating in the last degree when the destruction arises out of the very steps taken for its utmost protection. So far as the printing qualities are concerned, many negatives give finer pictures without varnish than with it, many varnishes having the tendency to reduce, slightly, the brilliancy and contrast in the negative. It is, therefore, in most cases for the sole purpose of protection that varnish is used. The numerous instances of late in which we have heard of the varnish cracking and destroying the picture, prove, however, that the protector becomes under some circumstances the destroyer. Under the operation of what law, it might puzzle the profoundest philosopher to decide; but it often happens, as recently remarked by Mr. Bedford, that the most prized negatives are the most certain victims. The only portrait of a valued and perhaps departed friend; the one choice view out of a series which have cost much effort and time, perfect in selection, lighting, exposure, and development, having passed through every process quite safely, is carefully varnished. If the fates be unpropitious, its doom is sealed: it may be that the picture is dissolved before the operator's astonished eyes; it may be that—safely put away in the box until opportunity serve for printing—it is found in a few months to be hopelessly cracked; or if it escape these fatalities, it may, if printed in the sun, stick to the print and be destroyed without remedy in removing. As all these misadventures are dependent on varnishes and varnishing, the question becomes, therefore, one of serious import to consider.

A very interesting discussion on this subject took place at the meeting of the Photographic Society, reported in our last. Mr. Thomas, in his paper "How to Varnish the Negative," stated his conviction that faulty manipulation was the most common if not the only source of these accidents, and that they arose most frequently from two causes; either the presence in the film of some minute portion of the fixing agent, from hasty and imperfect washing, or the application of the varnish when the film was not absolutely dry. In support of these allegations, he stated, as will be found in our report, the result of some enquiries he had made amongst first-rate photographers in extensive practice. He found that where hyposulphite of soda was used as the fixing agent, and the consequent copious and thorough washing bestowed, which is well known to be necessary to remove that salt, and proper attention given to thorough dessication of the film before applying the varnish, no matter what kind were used, cracked films were unknown. On the other hand, where cyanide of potassium was used for fixing and washing, and drying and varnishing were conducted hastily, this disastrous cracking was a familiar but unwelcome incident. We may add our own experience; we have varnished some thousands of pictures, positive and negative, fixed in both hyposulphite of soda and cyanide of potassium, and with almost every kind of varnish, and have never had either dissolution of the film whilst varnishing, nor cracking afterwards. We have always washed thoroughly, no matter which fixing agent was employed, and warmed the plate before varnishing, so as to secure complete dessication of the film, and the absence of all moisture from every part of the plate.

In regard to the especial influence of the various kinds of varnish in producing these undesirable results, we are struck with a signal omission in the discussion, which seemed to assume the form of amber varnish *versus* spirit varnish; whilst very little or no consideration was given to the known characteristics of the gums used in manufacturing the spirit varnishes. Mr. Thomas made a somewhat singular remark on the subject of spirit varnishes, the use of which, generally, he deprecated, namely, that their manufacture was a very simple matter, which anyone could undertake for himself, being merely a question of judgment and experiment in the selection and proportion of the gums. Now, we really have imagined that this judgment and experience, in selection and proportion, of almost every composition used either in photography or other arts, was the sole source of success in the hands of the successful, their absence the general cause of failure in the operations of the nonsuccessful. In any case we strongly recommend our readers, as the result of some considerable experience in the matter, not to attempt to manufacture their own varnishes. The operation *does* require a good deal of judgment and experience in the selection and management of gums and resins, and in the hands of the unskilful, generally results in the production of a useless article at a dear rate.

In regard to the gums used, it is well known to those experienced in such matters that certain gums have in themselves, apart from adverse circumstances, a natural tendency to contract and crack. The operator in glass positives knows to his cost this tendency in the asphaltum in his black varnish. As a general rule it will be found that those gums which have a tendency to swell up in their solvents like glue in water, have, like glue, a tendency to contract and crack in drying. Not necessarily at once: it may be weeks, months, or even years first; but the perpetual tendency to contract is present. We may mention, although not used in varnishes, gutta-percha as a striking illustration of this. Its disposition to contract is constant and perpetual, and in laying down tubing for water-pipes, it is generally put in the first instance in a curved or serpentine form, to allow for gradual straightening in contraction. Amongst varnish gums, copal is a sample; its well-known habit of swelling at first in solution, and contracting and cracking subsequently, is, notwithstanding its brilliancy and hardness, a considerable drawback to its use by painters. Mr. Thomas mentions it as an important constituent of his spirit varnish, a circumstance which may account for the fact mentioned by Mr. Bedford, that some negatives he had varnished with that varnish had cracked. Lac is without question one of the most valuable gums that can be used in a spirit varnish; it is at once hard and tough. Mr. Thomas states that he could never get a hard varnish from it. Those who remember the hard, vitreous, lacquered surface of Indian and Japan wares of various kinds, obtained only with this gum, and the enduring surface produced in this country by good French polishers with the same gum, will scarcely have any fear on the question of hardness. One difficulty in the way of its use arises out of the impression that it is absolutely necessary to use the bleached stick lac, which in the process of bleaching becomes very difficult of solution, and involves a good deal of waste in solvents. This, we think, for negative varnish is a decided mistake, as the presence of a little colour in the varnish is not an evil of moment. Good sandarac and lac, in suitable proportion, and with a little of some softer gum, such as elemi or benzoin, to give toughness, will, we believe, give a varnish equally free from tackiness and tendency to crack, and at the same time very hard and serviceable.

The objection raised by Mr. Thomas to spirit varnish, on the ground that it interposed a layer of gum between the negative and sensitive paper, and thus to some extent interferes with sharpness, if of any weight at all, holds good, we think, in all cases where a heavy-bodied varnish is used, and can scarcely be absent in the use of amber varnish, where, with an extremely volatile solvent like chloroform, it is left twenty or thirty seconds on the plate.

We have not used to any extent amber varnish in our own practice; but have seen very excellent results with it in the hands of others; the chief objection being that it is somewhat expensive. As to its durability, Mr. Thomas cites cases proving that nothing is left to desire in this respect.

Gum dammar dissolved in benzole is, without a question, the easiest to make, the easiest to use, and the most useless when applied, of all the varnishes used in photography. It is tacky in warm weather, pulverulent in cold weather, and blooms in damp weather. It has the saving grace of being easily applied and easily removed, giving it a certain advantage for negatives required purely for temporary purposes; but should be used for none other.

Regarding the tendency to dissolve the film which some spirit varnishes possess, there can be little doubt that it arises from the use of solvents too highly rectified. Absolute alcohol is altogether unnecessary: a strength of sixty over proof will be found for most purposes sufficient, and is the strength we believe most commonly used by large manufacturers of varnish. For this purpose methylated spirit is just as good as the pure spirit.

We would repeat, in conclusion, the importance of Mr. Thomas's remarks as to the careful washing and thorough drying before applying the varnish, as the best security against these annoying misadventures; and would also endorse the remarks of Mr. Hughes, to the effect that, for temporary purposes, and temporary purposes only, a soft or cold varnish may be used with advantage, but for a valuable negative, from which many impressions are required, a good spirit varnish affords the best reliance.

DIALOGUE SKETCHES. — No. 4. — In and of the Glass-Room.

(From a "Photographer's Common-place Book."*)

"Peculiar toil on single forms bestow,
There let expression lend its finished glow;
There each variety of tint unite
With the full harmony of shade and light.

* * * * *

from the light receding, or the eye,
The sinking outlines take a fainter dye.
Lost and confused, progressively they fade,
Not fall precipitate from light to shade.
This Nature dictates, and this Taste pursues
Studious in gradual gloom her lights to lose.

* * * * *

Give to the gazing eye
Th' expressive head in radiant majesty;
While to each lower limb the fainter ray
Lends only light to mark, but not display;
So let the pencil fling its beams around,
Nor e'er with darker shades their force confound,
For shades too dark, dissevered shapes will give,
And sink the parts their softness would relieve;
Then only well relieved, when like a veil
Round the full lights the wand'ring shadows steal;
Then only justly spread, when to the sight,
A breadth of shade pursues a breadth of light.

M. du Fresnoy.

Crackdbell and Brushart, continuing their conversation, are joined by Newart. Crackdbell's photographs being ridiculed by Brushart, as "flat, patchy, inartistic affairs," the former appeals to Newart, who being an experienced photographer, may, he thinks, be able to point out to what particular fault in his formulæ, lenses, chemicals, or manipulation such ill effects may be attributed.

Newart.—Your formulæ are mine; your lenses are excellent; and I can discover no faults traceable to chemical defects. Experience will doubtless improve your manipulatory skill; but there are in these specimens at least no ill results particularly due to this source either.

Brushart.—The fact is, I suppose that the various agencies of your art do pretty much as they please, and that good or ill effects are more a matter of chance, or luck, than anything else. At least, I've heard many photographers make some such assertion; although, thank heaven, I myself know nothing about that wilful, brain-bewildering, effort-baffling, coquette,—Photography.

Crackdbell.—I almost wish I could say the same; for the money and time I have wasted in trying to produce different results to those before you, have sent me to bed on many a weary night blue with despondency, and sick with unavailing efforts. Sometimes I thought the bath was wrong, sometimes the developer, sometimes the exposure, and I generally ended by finding them all wrong together, and beginning again with everything quite fresh and new, but only to produce pictures characterised by the same faults, and go through the same series of disasters all over again. I've read the various writers in our journals, until I almost thought their chief aim was to bewilder, befog, and confuse their victimised subscribers. All the hand-books ever published on photography are in that drawer, and, oh! lor, I've read them *all* through—*every one.*

Brushart. }
Newart. } —Ha! ha! ha! ha!

Newart.—The fact is, Crackdbell, you have never once considered that, to obtain perfect results in photography, one requires at least a knowledge of artistic effects.

Brushart.—Newart is about to teach you the *artist's* profession, Crackdbell; ha! ha! ha!

Newart.—No, I am about to remind him of a mistake which he made some years back, in asserting that photography was a mere mechanical process. My art, however, has avenged the slander, in a way he will not, perhaps, easily forget; and I really am cruel enough to wish certain critics I wot of could receive a similar lesson. However, I forgive you, Crackdbell, and if you will do as much for me I will prove to you that directly I apply the rules of your art to the practice of mine, the "flat, patchy, inartistic effects," denounced by Brushart, and so obstinately defiant of your efforts, will disappear.

Crackdbell.—I assure you I shall be grateful, even if you prove me the veriest fool ever betrayed by prejudice into error.

Brushart.—I'm growing curious.

Newart.—I shall only prove that photography is more nearly allied to art than you believed it. Will you please to place our friend Brushart in that position in which you would proceed to photogragraph him if he were a customer, or, if you please, a sitter. With your permission (to Brushart.)

Brushart.—With all my heart; and here I am in the photographer's own pose—one arm on this little round table, so; with the hand hanging down, so; the other arm at an acute angle with the body, so; with the fist doubled up, so; head to the shadowed side of the room, so; and eyes turned to the lighted side of the room, so; one leg thrown over the other, so; and, there I am. Must I "put on a pleasant expression?"

Newart.—Yes, that's the stock attitude, sure enough; but as I am not now about to give you the lecture upon posing, your present attitude will suit my purpose very well. Now, Crackdbell, with your permission, don't you perceive that while one side of Brushart's face is brilliantly illuminated with direct light, the deep shadows of the other are very feebly relieved with the faintest of reflected lights?

Crackdbell.—Yes; it is in much the same position with regard to light as that in which I should place it were I about to paint the same.

Newart.—But you would not render the contrasts so great in your painting—eh? For instance, your shadows would not be so black, nor with so little reflected light.

Crackdbell.—Oh! certainly not. But that constitutes the superiority painting possesses over photography. In painting, for instance, that grandly poetical and intellectual head of Brushart's, there, with its collar Byronic and neck-romantic air, I could easily soften and graduate my shadows with the brush, strengthening the reflexions by putting in touches of mellow and subdued light, here or there securing delicacy by carrying transparency or details into the deeper masses of shadow, and obtaining on the illuminated side of the face, those vitally important articles, which photography generally swallows up in a big flat mass of white paper. I mean the high lights. I could secure, too, those delicate intermediate tints, which so harmoniously unite the lights and shadows, and in short I could obtain what photography declines most pertinaciously to supply me with, viz., "*roundness*."

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* Continued from p. 387.

Newart,—Exactly so. Now why not secure these very qualities in your photograph by a proper treatment of your model?

Brushart (*comically*).—Ah! to be sure. Why not?

Newart.—The great difficulty which you create by illuminating your model as you now do will be found in this fact, that the contrast is too great between the lighted and the darkened sides of the head. The exposure which suffices to bring out the shadowed side is sufficient to destroy every trace of the half and intermediate tints, which give roundness to the lighted side; and that which suffices for the lighted leaves the shadowed side a dense mass of sooty black, void and without form.

Crachdbell.—Yes, that's the case, exactly.

Brushart.—And what's the remedy?

Newart.—The remedy lies in entirely altering the arrangement of your glass room. Shut out in the first place by far the greater part of your direct light.

Crackdbell.—Why, how am I to get pictures without light?

Brushart.—That's reform with a vengeance.

Newart.—I'll show you how to manage that. In the next place remove your sitter farther from the source of your direct light, because the nearer the object is to the illuminating source, the blacker the shadows; and because you thus weaken the intensity of the lights also. Of course in thus weakening the light, the shadows are proportionately strengthened; but to remedy this, so place some white screens that they throw a soft, but rather strong reflected light gradating from the extreme edge of the shadowed part of your sitter's face. See now that such direct light as you have does not fall upon any receding portion of the face, but rather upon the top of the brow and down the nose, just touching the swelling contour of the cheek. and the more prominent portions of the lips and the chin. The shadows may be rendered of just what intensity you desire by varying the strength, or the the actinic power (by color) of your reflected lights. If the white screen is not powerful enough, use a mirror. If you look at a face thus illumined on the focussing screen of your camera, it will strike you that the effect is tame and poor, that there is a want of vigour and brilliancy about it, but——

Crackdbell.—But, of course, the actinic power of the light, from the illumined and the shadowed side of the face. will have acquired that degree of uniformity essential to the result which I have so long and so vainly been seeking. Why. of course, it will. What a muff I have been, to be sure!

Newart.—But, although we may make all these arrangements, remember that the result may still be unsatisfactory, unless collodion. bath, and developer, be in the necessary harmonious relation to the amount and quality of light. However, as that can only be decided by test, let us set to work, rearrange the blinds and background, and victimise Brushart as a sitter.

Crackdbell.—Hurrah! for the experiment; come along! Now, Brushart up you get.

Consequently they bustle about, effect the proposed alterations, take a picture, and are all delighted with the result.

Brushart.—Yes; that is far less like a photograph than a painting. It's charmingly round, and—well, upon my word, it's—it's *artistic!*

Crackdbell.—Newart, I'm infinitely obliged to you, and ashamed of myself!

[They shake hands heartily and laughingly. Enter Snailowl, explaining that he has returned for a forgotten umbrella. They ask his opinion of the picture just taken.]

Snailowl.—Well; you know I liked your other arrangements, and the pictures you used to produce by my method of lighting. Now, the sittings will be longer, you see, and —well! the fact is, I like more intensity in the negative.

Myself.—That is to say, I suppose, more white in the proof: well, *I don't*.

A. H. W.

SCIENTIFIC GOSSIP.

Some curious facts in photographic statistics have been collected by a writer in the *London Review*, which will, we think, interest our readers. Under the heading "Photography from a Commercial Point of View," the writer institutes a comparison between Tiphaigne de la Roche's remarkable foreshadowing of photography, written in 1760, and the present position of this art. A rapid glance is first taken of the firm root which photography now possesses in the minds of the public, the gradual transformation of the roofs of the houses in our fashionable thoroughfares into crystal palaces, the popularity of the *carte de visite* style of portraiture, the allusions to the art in current literature, the necessity which there seems to have arisen for every large concourse of persons to have a camera looking at them to perpetuate "a tangible, transferable *memory* of the occurrence;" and lastly, how on the occasion of the late solar eclipse the whole scientific world was looking with anxiety for the testimony of the photograph, which was to set at rest questions and doubts with respect to the physical constitution of the sun, which might otherwise remain for ever unanswered. Allusions to some of the photographic *tours de force*, which have from time to time been chronicled in our pages—the photographs of an execution, the breaking wave, and the shell from the monster 36-inch mortar—next follow, together with the suggestions which we made for the employment of micro-photography in the art of warfare. The writer then proceeds to a consideration of the revolution which is being effected by this power in the arts, manufactures, and commerce of the empire. The aggregate number of photographers in the kingdom is considered to be underestimated at 10,000; and to minister to the requirements of this important body, societies are springing up in most of the towns in the kingdom, the manufacture of collodion has within the last few years more than quadrupled (the writer might fairly have said increased tenfold) the demand for the chemicals employed in its preparation. The manufacture of the glass plates finds occupation for several glass works, where they are turned out by the ton weight at the time; and the author next draws attention to the important article of commerce, which a bookmarker or photographic shirt stud becomes, when they are ordered by the thousand gross at a time. The article concludes by a consideration of the silver passing through the photographer's hands, in which it is estimated at the enormous amount of twenty tons weight per annum. We cannot help thinking that the writer of the article must have made some error in this estimation. We have unbounded faith in the capacities of our 10,000 confrères, to get rid of almost any amount of this precious metal; but twenty tons weight per annum seems rather too much to be credible. Why, the amount of "bath" this would make would float a man-of-war; possibly, however, this quantity is to be considered as made away with throughout the world, and in that case our Continental and American followers of the black art may be fairly answerable for a considerable number of tons. We have dwelt with some length on this article, for apart from its intrinsic merits it possesses interest, inasmuch as it shows as much as anything therein adduced the growing taste which the public take in our art, when a political and literary paper considers it necessary to keep its readers *au courant* with the most recent developments of photography.

Some interesting researches have recently been made on the oxalate of the peroxide of iron, by Dr. T. L. Phipson. He prepares it by dissolving the hydrated peroxide of iron in a boiling solution of oxalic acid, and evaporating the liquid until it crystallizes. The solution is of a beautiful green colour, and yields by evaporation, in a quiet place, emerald-green crystals, in the form of oblique prisms, very soluble in water. When these crystals are exposed to the solar light, they darken like chloride of silver; and if they are then treated by water, they dissolve with a peculiar crackling, and leave an insoluble residue of oxalate of the protoxide of iron. The experiment is very striking when the direct rays of the sun are allowed to fall on a large basin, the bottom of which is covered with crystals. That half of the crystals which are protected by the side of the basin remains intact, the other half darkens rapidly. The same decomposition takes place in the green solution: indeed when this is exposed to solar light, it gradually deposits yellow oxalate of the protoxide in the form of microscopic crystals. After a prolonged exposure to light, all the green salt of the peroxide is decomposed, with deposition of the yellow salt of the protoxide, and the supernatant liquor becomes perfectly colourless. These experiments are curious; and now that the photographic susceptibility of oxalate of the peroxide of iron has been so recently reproposed as a means for measuring the chemical action of light, they will be regarded with great interest by our scientific readers.

The results of some experiments undertaken by Mr. Bernard Piffard, in the preparation of nonconducting substances, for electro-deposition, by a chemical process, have recently been published. For this purpose he prepared a sheet of gutta-percha as follows:—1st, with a solution composed of equal parts of white of egg and a saturated solution of commen salt in water, and dried thoroughly; 2nd, with a strong solution of nitrate of silver, which when dry was exposed to the light till quite black; and lastly, with a saturated solution of proto-sulphate of iron. This last produced a highly conducting surface of metallic silver. On attaching it immediately (before dry) to the wires of a battery, and immersing it in a solution of sulphate of copper, he obtained a very uniform and rapid deposit without the help of guiding wires. This process is very interesting, and affords strong grounds for believing that if a good collodion positive were submitted to the action of a battery, with a a view to the deposition of metallic copper or other metal on it, interesting and valuable results would ultimately follow. The value of such a process, whereby the thin delicate silver film as it exists on a positive, could be transferred to (and perhaps multiplied from) a durable plate of copper, is too obvious to need comment.

A patent has just been obtained by M. J. F. Mayr, of Vienna, for obtaining light. Such an invention appears to us scarcely either needed or practicable, but as it appears to contain some points which may be of interest to our readers, we give a brief abstract of it. The invention relates to a peculiar system or mode of obtaining an instantaneous light, suitable for lighting a candle, for instance, without the aid of matches, and consists in the employment of a small frictional electric machine. The disc or cylinder of the machine may be composed of glass, hard india-rubber, or other material, but india-rubber is found to answer very well. The rubber or pad is supplied with a peculiar amalgam, the composition of which constitutes one of the main features of this invention. This amalgam consists of one part by weight of spelter or zinc, one part of tin, and one half part of quicksilver. The spelter or zinc is first melted, and the tin is added thereto and well mixed together, after which the mercury is added to the molten mass. The whole is now poured on to an iron plate, when it is cooled, and subsequently reduced to powder in a mortar, and passed through a fine sieve, which completes the preparation of the amalgam to be employed. The current of electricity generated by the machine is conducted to a metallic vessel, containing a mixture of alcohol and sulphur, this vessel being insulated. A cotton or other wick in this liquid is in connection with a charcoal electrode, carried by the cover of the vessel. Above the end of the electrode is a metal wire, or negative pole, for the purpose of obtaining the electric spark when the machine is set in action.

Our juvenile readers will be pleased to hear that Professor Faraday has undertaken to deliver, at the Royal Institution, during Christmas week and the following week, a course of six lectures on "The Chemical History of a Candle."

Critical Notices.

NORTH WALES ILLUSTATED. A Series of Views by Francis Bedford. Chester: Catherall and Pritchard.

The names we have just written in juxta-position, North Wales and Francis Bedford, will suggest at once to most of our readers some very lovely and picturesque stereographs; glorious scenery and perfect photography combined. Abounding with views pre-eminently adapted to the stereoscope, Wales has been a favourite resort with landscape photographers, and its scenery has been *done* in almost every style. Who, for instance, is not familiar with the *Rustic Bridge at Beddgelert?* But how few have obtained such a picture as this before us, No. 174 of the series? Nothing could more forcibly illustrate how far the photographer may also be an artist than these pictures, and the taste, judgment and feeling of the beautiful which has regulated their selection.

Perhaps one of the greatest gems of the series — it is almost invidious to select where all are good—is No. 186, *Beddgelert, Pont Aberglaslyn*, from below the bridge. Unlike so many photographic renderings of water, which present little but a glaring mass of white paper, the stream here is thoroughly transparent, and dark with the shadows of overhanging rocks and foliage. Just at the bend of the river, portion of the arch of a bridge embowered in foliage is seen, beyond is distant foliage, whilst the extreme distance is a huge, rugged hill, which shuts out all but a glimpse of sky. Scarcely inferior in beauty of an entirely different class, is *Capel Curig, Moel Siabod*, No. 130. Here the foreground consists of a broken wall and bold woodland scenery; whilst the atmospheric effect in the retiring foliage and distant hills is most beautifully rendered.

A *Water Mill at Trefriw* is a most charming slide and full of poetry, the disused, silent wheel forming a striking contrast with the tumbling, headlong water, which rushes down by its side, as though glad to escape its accustomed work, and boisterously bent upon a holiday among the wild foliage which overhangs the stream into which it hurries. *Llanberis Pass*, from *Pont-y-Cromlech*, pleases us less: an admirable chosen scene, consisting of a stream running its zig-zag turbulent course, dashed hither and thither by the huge boulders which so plentifully intercept its passage, between the far-reaching rocky hills which hem it in on either side, its chiaroscuro is sadly marred by a mass of ungraduated white sky. *Cottages, at Aberglaslyn, Beddgelert*, otherwise a lovely picture, is marred by the same fault. *Bettws-y-Coed, Pont-y-Pair*, from below the bridge, is a magnificent production, and leaves nothing to wish, except the annihilation of time and space to the extent of placing the beholder by the side of the youth who reclines there on the green knoll in the glorious summer time. *Llanberis Slate Bridge* is another of our favourites in the series; but we must forbear further detail. The series throughout, in an artistic point of view, is full of beauty; photographically or stereographically, there is in some of the pictures a slight tendency to chalkiness from under-exposure and over-development, which we could wish had been avoided, as we could that of the white skies to which we have referred in a few. As a whole they are amongst the most charming stereographs we have seen. The series will form a valuable addition to the delights of many a Christmas meeting.

CHESTER ILLUSTRATED: A Series of Views for the Stereoscope. By Francis Bedford. Chester: Catherall and Pritchard.

There are few of our old cities possessing more features of interest for photographic illustration than the city of Chester, and the series before us does full justice to all those interesting features. The quaint old houses presenting their pointed steep gables to the narrow streets are highly picturesque, and tell their own story of times long before railways, electric telegraphs, and photography. This series will form a rich treat for many besides the archæologist.

SMASH! A Sketch of the Times; past, present, and again to come. London: Houlston and Wright.

To what comical chance can we possibly owe the presence of this *brochure* on our editorial table? It records the vicissitudes of a house in "the paper trade:" we are interested in paper, certainly; but the paper in which we are chiefly interested is used to produce photographs, whereas the paper here referred to is used to produce—acceptances, or rather, to speak more classically, and in our author's phrase, to "fly kites;" and that is a pastime which we, luckily, have never indulged in since our school-boy days. On one point we can set the reader's mind at rest. We remember a story of Dr. Chalmers, who, when recommended by a friend to read a certain work, inquired: "Is't a big book?" This is not a big book: but in something less than two-score pages reads a lesson, in narrative, rather than didactic form, against the evils of "accommodation bills." The sketch is clever, and the lesson instructive.

HOW TO VARNISH THE NEGATIVE

This subject is deserving of careful attention, at the same time all that can or need be said concerning it may be stated very plainly and in a few words.

I will endeavour to explain and comment upon the two methods now in use, and will distinguish them by the terms "hot" and "cold." I apply the first term hot to the process making the warming of the plate necessary, previous to pouring on the varnish, which is applied whilst the plate is still warm. This method is very generally followed notwithstanding the inconvenience of heating the plate; for the reason, that the coating left upon the surface is perhaps harder than when cold varnish is applied, and consequently stands a greater amount of rough treatment: no doubt a desideratum. Ordinary spirit varnish, whether French or English, contains a certain amount of water; that is to say, the spirit generally used is not absolute. A more fluid, and consequently a better varnish can, I think, be made with absolute alcohol, at least such is the result of my experiments; but whatever strength of spirit is used, the effect of all spirit varnishes, more or less, is to interpose between the image on the surface of the negative and the prepared surface of paper, a layer of gum more or less thick. I need hardly say that any intermediate film must prevent absolute contact of these surfaces, and consequently detract somewhat from the sharpness of the picture.

There can be no very great mystery as to the composition of spirit varnishes, when it is considered that the gums we have to select from are not numerous; viz. copal animi, sandaric, thus, mastic, lac, and dammar; these gum resins have, however, various properties, some being harder and more vitreous than the others, whilst some are sticky and resinous. It is therefore very desirable to make use of both these qualities by selecting and combining judiciously such of the gums just enumerated as shall give a varnish possessing hardness and durability, with sufficient elasticity. The hardest gum cannot be used alone, but must be mixed with one more resinous, in order to provide against the possibility of cracking or splitting up of the surface left on the plate. I find that a mixture of the three first on my list answers the conditions just laid down, if absolute alcohol with a small per centage of chloroform is used for the solvent. This varnish has proved, in my hands, the best of the spirit varnishes. I have heard it remarked that this, and no doubt other strong spirit varnishes, occasionally have a very unhappy property of removing the image from the negative; I must say, that I have never been able to produce this undesirable result myself, and think perhaps that such an action may have been due either to moisture in the film, unequal application of heat to the plate, imperfect washing out of the hyposulphite of soda or cyanide, or to some rottenness or peculiar condition of the film of collodion. The advantage and disadvantages in the use of spirit varnish may be briefly stated: in its favour, a greater hardness of coating; against it, the inconvenience of having to heat the plate, and loss of sharpness in the positive from the interposed film of gums left upon the surface of the negative.

Having disposed of what I termed the hot process, it only remains to draw attention to that designated "cold." It is not my intention to enumerate the various solvents and gums which are or might be used for the manufacture of cold varnishes. I have tried many of them, and find that all are, more or less, tacky when dry.

I shall confine myself to a few words descriptive of the best cold varnish, which, unquestionably, is that made by dissolving amber in chloroform. Many will be surprised to hear that such a thing as a package of fine amber seldom if ever finds its way to this country; but plenty of a very inferior and rough description is to be met with. The finest kind is used for making the mouthpieces of pipes, which are, I am given to understand, of foreign manufacture. Having learnt this much, I set to work to obtain, through my drug merchants, some further information on the subject, and was fortunate enough to find out the holder of a large quantity of the chippings, from the fine pieces of amber, which he had been provident enough to stow away. This is not a coarse powder of amber, but unmistakeable chippings, cut as with a sharp instrument, bright and clear in quality, in every respect equal, for making varnish, to the fine and most costly pieces, of which indeed these chippings are a portion. With such a sample as this, there is no difficulty in producing a varnish in every respect desirable for photographic use, and sufficiently hard to withstand any friction the surface of a negative is likely to meet with. The coating left upon the negative is perfect, and can be hardly distinguished from the patent plate: this varnish penetrates the film, and adds very much to the beauty and clearness of the negative, at the same time leaving upon the film the thinnest possible coating, thus admitting of the most perfect contact with the excited paper.

I have had opportunities of examining some hundreds of negatives, produced by various operators, both amateur and professional; many of which were more or less disfigured, if not damaged by the varnishing operation. My method of using the amber varnish is as follows: I invariably make use of a little distilled water, with which I wash finally the finished negative; this removes the salts of lime that exist, more or less, with other impurities in all waters, in quantities quite sufficient to prevent the formation of a brilliant surface. (I consider this simple but cleanly operation one of the important photographic "insect cores.") Now set the negative up to drain and dry spontaneously, its face to the wall, and its lower part resting upon a slip of clean bibulous paper; it is as well to change this slip of paper once or twice: when surface dry, the negatives may be put into a grooved box to keep them from dust, and if more convenient, they may be varnished next day. All varnishes should be applied in a dry room.* Attach the back of the negative to a pneumatic holder kept for the purpose, and having poured into a glass measure more of the varnish than is required to cover the plate, proceed to pour on as much as the plate will hold; keep the plate as horizontal as possible, and let the varnish soak well in for twenty or thirty seconds; then, gently raise the plate and pour back into the measure the excess from the nearest right-hand corner. The varnish must not be dashed off, but the plate very gently elevated at first only just out of the horizontal and very gradually raised until it stands vertically on the edge of the measure; in this position let it remain a few seconds; on no account rock or give it any eccentric motion, and during the whole operation hold the breath, or turn the head away from the plate to breathe.

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* Just before varnishing, pass the back of the plate over the flame of a

Always have two bottles for varnishing, the one to contain the stock of bright filtered varnish; the other to receive the portion poured back into the measure from the plate: when sufficient has been collected in this bottle, filter it through paper into the bright stock bottle. Amber varnish filters most rapidly and with a very slight loss. The measure used should not be washed out, but kept turned down and free from dust; it is then always ready for the purpose required.

I possess a negative portrait of Sir John Herschel, taken about six years ago, that I value very much; this plate was varnished with some varnish made of very fine amber, it does not show the slightest sign of decay, is indeed harder than when first varnished. I have also negatives kept under various circumstances of damp and heat for eight years, and still perfect. I am not alone in expressing a strong opinion in favour of amber varnish, both my own experience and that of many photographers enable me to recommend it in preference to any other, and I think the thanks of photographers are due to Dr. Diamond, who I believe some years ago first introduced it to notice.

ON A NEW METHOD OF DECOLORISING THE NITRATE BATH.

BY MR. TUNNY.*

All who have been accustomed to print upon albumenized paper must have felt the greatest inconvenience to be a rapid deterioration of the silver bath, rendering the prints mealy and rather scummy upon the surface. This, to a certain extent, has been remedied by the use of animal charcoal and kaolin. No doubt the filtration of the silver bath through these substances frees it from colouring matter; but the large quantity of phosphate and carbonate of lime they often contain renders the bath strongly alkaline; and, also, the strongest bath will, after their use, be found to be very much diminished. The practical photographer, who weighs out his silver by ounces instead of grains, is very sensitive to this fact. In order to lessen the one and remove the other, I instituted a number of experiments for the attainment of this object; and I am glad of this opportunity of informing the members of our society that I have been successful, not only in clearing the bath from its inky blackness, but also in imparting to it the property of permanently retaining its restored crystalline purity.

I have here a bottle of nitrate of silver solution, which has been used for the purpose of exciting albumenized paper. It is not so black as I would have liked it for this experiment; but sufficiently so, I dare say, to illustrate the ease with which it can be purified. The solution is slightly alkaline, as may be demonstrated by the test paper. I now put into this silver a drop or two of a *saturated solution of citric acid*. A drop or two is quite sufficient for a considerable quantity of fluid. You will now see taking place a flocculent deposition, which is citrate of silver, and that this is nearly all re-dissolved by a little shaking. All that is now required is simply to filter, in order to have the silver as pure as when it was first made into solution.

It will be found, on examination of the filter paper, that there is nothing to be seen but a slight discoloring of the paper. Now to test paper it is slightly acid, which is the best condition of bath to give vigorous prints. It will be seen that paper sensitized on an alkaline bath will be found wanting in vigour, when compared with prints which have been prepared by a slightly acid bath.

In connection with this, I will, on another occasion, take an opportunity of bringing before you a modification of the ammonio-citrate of silver bath for sensitizing albumenized paper, which gives a beautiful tone of colour, even without the use of gold. And here I would just mention to those who have not had much experience in toning with gold, that it is of the utmost importance in successful toning not to have the bath strongly alkaline: all that is required is that it be merely neutral. All the prints I have sent out for the last ten years have been toned with a neutral gold bath. As to the permanency of prints, no matter how they are toned, if they are not sufficiently washed with boiling water, I have great fears of their ultimate destruction. I think this fact cannot be too often brought before the professional photographer, as I fear, in many cases, *permanency* is too often sacrificed to a desire for black tints.

Correspondence.

FOREIGN SCIENCE

(*From our Special Correspondent.*)

Paris, 19*th December*, 1860.

The solar camera continues to be an object of great interest in connexion with the demand for life-sized portraits, and of much discussion also. Mr. Claudet pronounces emphatically that Woodward's instrument is a complete solution of the most difficult problem in photographic optics, founded upon a wonderful principle, and giving marvellous results. He denies the necessity for reducing the aperture of the lens by a diaphragm to a size so small that the image of the sun shall cover it; nevertheless he does not admit that we utilize all the light of the sun condensed into a bundle of rays reduced almost to a point, after having illuminated every point of the negative. Mr. Claudet's observations however, having been disputed by equally skilful observers, I shall give you the result of the discussion that took place at the last meeting of our photographic society. The principle of the solar camera consists in forming an image of the negative to be enlarged by the centre only of the compound lens, this latter being moreover reduced to the smallest possible aperture, without sacrificing any of the light illuminating it. Every point in the negative is visible only in the image of the sun reduced almost to a point, it is an error to suppose that these rays, setting out from the various points of the negative, are received by the whole of the enlarging lens; this latter, in Woodward's camera, in its anterior surface, that next to the negative, is reduced to a diameter of one-half to three-quarters of an inch, to which the diaphragm gives a circular form. This circle receives the summit of the bundle of rays of convergent light passing through the negative, because it is placed in the focus of the collective lens, it thus becomes an extremely brilliant luminous centre, the summit of the divergent cone which projects the enlarged image on the screen. By fastening a wafer upon this small centre, or covering it with a piece of silver, the enlarged image is completely extinguished. The experiment has frequently been made, and it cannot be otherwise, because all the rays which illuminate the negative are convergent rays meeting at the centre in question, as the negative sees this amplifying lens only at this centre, and as it is this centre only that radiates towards the amplifying lens.

The enlarging may be effected in two ways:—

Firstly.—Suppose ourselves placed opposite the lens of a camera; our reduced image is depicted in the focus of the

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lamp, to drive off any moisture; allow the plate to cool before pouring on the varnish.

[*] Read at a meeting of the Photographic Society of Scotland, on Tuesday December 11, 1860.

lens on the ground glass. Suppose this image to become suddenly luminous of itself, and that in its turn it radiates towards the lens, and that at the place where we stand we place a large ground glass or sheet of white paper. By virtue of a principle in optics, these rays, in retracing their path to traverse anew any kind of optical combination, pursue exactly the same route they first took, the rays emanating from the supposed self-luminous image will form, on the paper or ground glass, our image, of its natural size. This mode of enlarging, founded on the fundamental principle of conjugate foci, is not, however, that of Woodward's camera: but is found in all amplifying apparatus proposed previous to the appearance of Woodward's; or, rather, it is not the negative which, in Woodward's apparatus, plays a part of the conjugate focus, as in all other apparatus of this sort. It is the little image that the convergent rays project in the focus of the collective lens, upon the central portion of the anterior surface of the amplifying lens, which plays, in relation to the enlarged image, the part of conjugate focus.

Secondly.—Pierce a small hole in a shutter or screen, placed opposite a landscape or any other object, the luminous rays emanating from every point of this object, meet at the hole, and pass through it, expanding; the convergent cone, at entering, becomes behind the screen, a divergent cone, which depicts upon a screen an image as large as may be desired, provided the screen be removed to a proper distance from the hole. This is the principle of the camera obscura invented by Baptista Porta; now, it is in accordance with this principle, in great part at least, that the enlarging is made in Woodward's apparatus, and why, also, he calls it the *solar camera*. It is so simple, that it is a wonder it is not generally understood. But what has Mr. Woodward added to the principle of Porta? in what way has the camera obscura become the solar camera? He makes an image of the sun fall upon a mirror placed at an angle of 45°, and causes a large collecting lens to receive the parallel rays reflected by the mirror: by the action of this lens the bundle of parallel rays is transformed into a bundle of convergent rays, which pass through the negative, and inundate it with light. By making the summit of this convergent bundle of rays coincide exactly with the little hole in the camera obscura of Porta, he centuples, if I may so express it, the brilliancy of the rays at their point of intersection: and by placing an achromatic lens behind the little hole, the divergence of the rays is accelerated, the amplification of the image is hastened, and the sharpness of the amplified image is secured, after increasing its brilliancy a hundred-fold. Such is the secret of the solar camera.

In ordinary apparatus, the negative occupies one of the conjugate foci, while the enlarged image occupies the other; in the solar camera the negative is replaced by an image of very small dimensions, and exceedingly brilliant, situated almost in the centre of the amplifying compound lens. It must be clearly understood that the convergent lighting is an essential condition of enlarging by the solar camera. So soon as we speak of parallel lighting, we deny the great progress realized by Mr. Woodward in his solar camera, and revert to enlarging by the principle of conjugate foci, with an enormous loss of light.

In my last letter I described M. Fargier's process of carbon-printing; the results are truly admirable, both from the purity of the lights, and the delicacy of the details of the image, very superior to the positives, obtained by the ordinary methods; being printed with pure carbon, they are undoubtedly permanent. I hope to learn that some of your readers have put the merits of this ingenious carbon-printing process to the test.

M. Carré proposes the following very curious and important method of obtaining ice in large quantities by artificial means. He takes two iron retorts, capable of resisting a pressure of eight atmospheres. The iron bottles in which mercury is imported answer very well for the purpose. One of them is filled with a highly saturated solution of ammoniacal gas, and it is then connected with the other empty retort by an iron tube. A small furnace is placed under the retort containing the ammonia, to raise its temperature; the other retort is placed in a vessel of water of the ordinary temperature. Under the influence of the heat the ammonia is disengaged from its solution, and fills the second retort; the pressure soon increases considerably in the latter, and at length becomes so strong as to liquify the ammoniacal gas. When the liquification is accomplished, the furnace is withdrawn from the first retort, which is left to cool; the pressure in the interior diminishes, and when it has become sufficiently cool, the liquid ammonia suddenly reassumes its gaseous form, deriving the requisite heat from the water surrounding the retort. A portion of this water is quickly frozen, and in this manner about six pounds of ice may be at once obtained. By repeating the operation, we multiply the quantity of ice obtained. The apparatus is of extreme simplicity, and of marvellous efficacy, and the cost of producing the ice almost nothing.

Amateurs and Professionals.

Sir,—I quite agree with your remarks in the "Dialogue" last week, touching professional operators, in the reason that many of that class in provincial towns are excelled by amateurs, who, generally speaking, are very enthusiastic and determined to succeed, whereas many professional operators care little whether they improve or not. Many of them have taken up photography, thinking, all at once, to make a fortune without the slightest previous training or taste for art. Amateurs, on the contrary, are generally men who, having had a good education, see that to equal the productions of the best artists, they must study the principles of art. I believe that, as a body, they care little for taking portraits; landscape work is their *forte*. Now a professional, during the dull winter months, sometimes tries his hand here, *buys* some dry plates, and takes subjects for the stereoscope to sell in the summer season, forgetting that a winter scene presents a totally different aspect in the summer, the time his customer sees it. The amateur, on the contrary, takes his pictures during the summer, and by this means beats the professional into fits. My advice to professionals is this:—During the dead winter months, go to London, study well the portraits taken by real artists, and endeavour to emulate them. Leave the landscape work for amateurs (half of whom are in reality professionals), who, by education and taste, are more fitted for this pursuit than men who have left their original trade as shoemakers, tailors, clerks, *et id genus omne*, and whose idea in taking a house is, that they are to take bricks and mortar merely, not to try and make a *picture out of the bricks and mortar*.—I am, sir, your obedient servant, An Amateur and Professional.

REPORT OF THE EXPERIMENTAL COMMITTEE OF THE SOUTH LONDON PHOTOGRAPHIC SOCIETY, ON THE DRY PROCESSES.

The first subject chosen for investigation has been the Dry Processes generally. The question being naturally a very wide one, the Committee could not possibly, in the short time they have had at their disposal, arrive at any decisive conclusions on it. Indeed, considering the large number of formulæ for dry plate photography, they scarcely anticipate being able to do more than practically to compare the different processes one with the other, and carefully to note and point out the good and bad qualities of each. If in addition to this they succeed, in advancing another step, however slight, towards the elucidation of this important subject, they feel assured that their time will not have been misapplied.

In this report, which must only be considered as a preliminary one, the Committee have given their opinions and experiences individually, and not collectively, a plan they purpose adopting on all future occasions.

The first question which the Committee considered was, *the possibility of preparing dry plates to equal wet collodion in* *sensitiveness*, and as a short step to its solution appointed a sub-committee to test Dr. Norris's plates, which were stated to be the most sensitive hitherto produced. After most careful trials, the individual opinions arrived at tallied, as nearly as possible. with that of Mr. Davis, here given :—

"My inference," he says, "is, that the plates at present prepared by the Dry Plate Company are about one-third less sensitive than by the most rapid wet collodion, and equal to that of average sensibility." Having thus established the certainty that sensitive dry plates can be prepared, the Committee are now engaged in investigating the principles involved in producing qualities favourable to that end.

The Committee have next to place before the Society the result of some general experiments which have been made by individual members, commencing with the following valuable remarks oby Mr. Davis :—

General Remarks on Dry Plate Photography.

BY MR. SEBASTIAN DAVIS.

In conducting some experiments in connection with the Experimental Committee of this society, I have at present directed my attention to the principles involved in the preparation of dry plates. Dry plate photography, as at present practised, divides itself into two methods of proceeding; we have upon the one hand those processes which are based upon the principle of introducing organic compounds, soluble in water, into the pores of the film; and, on the other, the combination of albumen with collodion and its subsequent conversion into an insoluble state. The practical advantage which attends the adoption of the former method, arises from the facility with which an aqueous developing solution permeates the structure of the film, thereby favouring rapidity of development. This easy solubility of the preservative media in water necessarily precludes the possibility of a retentive power being exerted between the glass and collodion film by its agency. Pure albumen, on the contrary, is not only susceptible of actinic impression when in combination with many salts of silver, but it possesses an adhesive capacity in an eminent degree. Albumen, unfortunately, is not entirely efficient as a preservative agent, inasmuch as all its sensitive combinations with salts of silver are liable to spontaneous decomposition, even in complete darkness. We thus have two classes of media, the nitrogenous and the non-nitrogenous; each possessing special qualifications as preservative agents, but neither unaccompanied with characteristic deficiencies.

The special experiments to which I would call attention are those made with preservative agents soluble in water, and which, when applied to the collodion film, renders it pervious to aqueous solution after a preliminary dessication. The bodies that possess this property, and which are most worthy of notice are, gum arabic, British gum, gelatine, metagelatine, extract from the dried grape, glucose, dextrine, infusion of malt, sweet wines, molasses, oxymel, melted sugar, and the mucilages prepared from linseed, quince seed, carrageen, &c. In experimenting with these bodies, I have considered it indispensible to practical success, that they should be capable of preserving the collodion film in a sensitive condition, without the presence of free nitrate of silver. I have, therefore, converted the free nitrate salt into a chloride of silver, by washing the excited film in an abundance of common filtered water. By then covering the plate with different solutions of the above-mentioned bodies, of suitable strength, photographic results of more or less practical importance will become apparent. Gelatine and metagelatine will be found to possess the inconvenience of requiring a more thorough soaking in cold or hot water, between exposure and development, than is compatible with the tenacity of the most suitable collodion film. Gum arabic, under all circumstances, is liable to enter into spontaneous decomposition, when brought in contact with the sensitive surface, and many foggy pictures are the inevitable result of its employment. An infusion of malt and linseed offer practical advantages over gum, arising from the facility with which they can be washed from the collodion surface; they do not, however preserve the plate for many days, so as to ensure clean and perfect pictures. A similar drawback accompanies the use of molasses, oxymel, solution of melted sugar, and a mucilage of quince seeds, or carrageen. If we except some partial and peculiar stains, British, or sweet wines (as ginger and raisin), act excellently as preservative agents, provided the superfluous quantity be gently washed from the surface of the plate before drying. The extract obtained from the dried grape as imported to our country, appears to afford a solution equal or superior to any of the above; whether its use will prove to be accompanied with any practical obstacle to uniform success, must be left to the decision of further experiments. Upon a future occasion I hope, with the assistance of my colleagues, to form a specific opinion with respect to the best dry plate process for landscape photography, and to furnish a report upon the practical and theoretical merits of the recent suggestions in connection with the preparation of collodio-albumen plates.

Mr. Davis has also made some highly interesting experiments on the Petschler and Mann process, the particulars of which he has promised to impart at a future opportunity.

Mr. Bochert, of the German Hospital, Dalston, has been indefatigable in his experiments on this subject, and his communication is the more valuble because he illustrates every step of it with an experimental plate.

Although the following extracts from his notes are not, perhaps, so conclusive as might be desired, yet the Committee hope that in placing them before the Society, the members may be induced to experimentalise in some of the directions pointed out, so that useful conclusions may ultimately be arrived at.

Mr. Bochert's Experiments on Sundry Dry Processes.

Dr. Schnauss, lately making some experiments on iodide of silver, comes to the conclusion that *iodide of potassium employed before exposure on a sensitized film, nearly destroys all sensitiveness to light* and leaves it to practical photographers to draw their own conclusions.

There appears to me one important case for doing so in the collodio-albumen process, where, over a sensitive film, iodized albumen is poured. According to Dr. Schnauss, sensitiveness ought to vanish away hopelessly, as the second sensitizing is pronounced to be unable to restore the previous sensitive condition of the iodide of silver in the film. Nevertheless the efficacy of the collodio-albumen process is beyond doubt.

I repeated his experiments with the following results :—

Plate 1 had a weak solution of iodide of potassium poured over its lower half, and was then well washed, redipped for one minute, and exposed. The result was as described by Dr Schnauss, a nearly complete loss of sensitiveness. The part treated with iodide of potassium had a dense dead yellow colour and was not transparent at all, like a film produced by an over-iodized collodion. It struck me, that through over-iodizing, the film may only become inaccessible to the sensitizing bath because its meshes are blocked up.

I repeated the same experiment (plate 2), and allowed the plate in re-sensitizing to remain in the bath for five minutes, instead of one, and I obtained a picture as dense as can be desired. This proves, I think, that Dr. Schnauss's experiment allows no conclusion on the chemical properties of iodide of silver, but on the state of mechanical deposition of the iodide of silver in the meshes of the film.

His third experiment of treating an exposed plate with iodide of potassium, exposing to daylight, then washing and resensitizing (but now five minutes instead of one), I have repeated, and got a dense picture, the little fogginess of which I am inclined to attribute to faults of my own.

Mr. Bochert then directed his experiments to Petschler and Mann's modification of the collodio-albumen process, and after many trials, gave it as his opinion that the plates, previously to the final washing, could not with safety be exposed to diffused daylight.

He then goes on to say :—

Now Mr. Petschler suggested that iodide of potassium gave similar results to his process. Finding the chloride not answer, I tried the iodide. Plain albumen, containing two grains of iodide of potassium per ounce, was poured over the washed sensitized plate. After drying, I tried the sensitiveness to diffused light, by exposing one-third to the sun for twenty minutes, another third to dull diffused light for three minutes, and kept the last third entirely protected. After twenty-four hours' keeping, the plate was soaked in water for half-an-hour, then fully washed under a tap for several minutes. After drying, exposed in a stereoscopic view camera to an object strongly illumined

> by the sun for six minutes—in developing, no trace of picuret could be obtained; but long exposure to sunlight of one-third of the plate produced a slight fogginess, which might not perhaps be much noticed on a strong picture behind.
>
> Now, I remembered Dr. Norris's suggestion, that in the case of iodide of potassium on the film, hot water removed more completely this salt. I prepared a plate similar to the last, soaked it in cold water for half an hour, and washed it by pouring over it about a pint of hot water. After drying, I exposed the same time as before, and obtained a dense strong picture.

From this last experiment, he draws the conclusion, that when plates are required, which, in their comparatively insensitive state will bear moderate exposure to daylight, it will be better to prepare them by the Taupenot process, and make use of Dr. Norris's suggestion to finally sensitize by washing with boiling water,

He obtained highly promising results by Dr. Riley's process, as given by Mr. Parry at the meeting of the Manchester Photographic Society in October last. After sensitizing and well washing the plate, he coated it with uniodized albumen, and then, draining for a few minutes, immersed it in boiling water. Exposing in the camera, the resulting negative developed out remarkably clean, and any amount of intensity could readily be obtained. He has promised to continue his experiments in this direction.

In speaking of the Fothergill process, Mr. Bochert makes the following interesting communication:—

> Fothergill's process, as advocated by Mr. Ackland, gave in my hands good results, although the least deviation from the prescribed manipulations is followed by a series of different descriptions of stains. As an essential point, I mention here the use of four to six drachms of distilled water for the first washing, and the prepared albumen containing five minims strong ammonia in three ounces liquid (one part albumen to two of water), or half a drop strong ammonia per ounce.
>
> I was advised to try a modification of the Fothergill process, propounded by Mr. Hannaford at a meeting of the South London Photographic Society, which was to ensure entire freedom from stains. Mr. Hannaford does not dilute with four drachms of water, but washes the plate under a tap, redips it into a weaker silver bath (four grains per ounce) and pours on a solution weak in albumen (one part to six of water), but strong in ammonia (about four drops per ounce), and containing between ten and twelve grains of citrate of ammonia per ounce.
>
> I tried Mr. Hannaford's process, and found it answer perfectly, the plates being certainly free from stains, but requiring 25 per cent. longer exposure. In dry plates I think a little longer exposure does not much matter.
>
> To what circumstance must I look for the difference of results?
>
> The albumen may produce in both cases albuminate of silver; certainly a larger amount in Ackland's. The albuminate being soluble in ammonia may be liquified and washed off (being in small quantities) in Hannaford's; very likely not in Ackland's, or not entirely, and perhaps assisting in the formation of stains.
>
> The citrate of ammonia, easily soluble in water, could not, after washing under a tap be supposed to assist anyhow; it may in the first instance convert the minimum of nitrate of silver combined with the pyroxyline, either chemically or mechanically, into citrate of silver: but this citrate (an infinitely small amount) being easily soluble in ammoniated water, will wash off under the tap.
>
> Starting from the inestimable experiments of Hardwich and others, on the value of all the substances used as preservatives in the dry process, which prove distinctly that their influence is *essentially mechanical*, keeping the pores of the film in a distended state during drying, and giving easier access to the developer—that their chemical influence is only experienced when they are combined with oxide or nitrate of silver, and even then to the detriment of the keeping of the plates:—I was of opinion that the larger amount of ammonia in Hannaford's process, having little or no action on iodide and bromide of silver, exerted, what I may be allowed to call, a last and complete *cleansing effect on the film*, taking away all silver compounds out of the meshes of the pyroxyline, and relieving the iodide from any embarrassment through preservatives, which take now-a-days all the glory to themselves, putting the hard-working man (iodide of silver) into the dark.
>
> I now prepared a number of plates, taking care to work with the same collodion, bath, &c., exposing at the same hour of the day, on the same object, and in close comparison to one plate prepared according to Hannaford's formula. It is clear, that following my supposition, the second sensitizing was at once a waste of time and labour.
>
> As modifying or cleansing liquids I employed (*a*) *ammonia and water*, four drops per ounce; (*b*) ammonia and water, two drops per ounce; (*c*) ammonia and water, one drop per ounce, with two grains of citrate of ammonia; (*d*) acacia and water, with two drops of ammonia per ounce; (*e*) Hannaford's normal prepared albumen, containing four drops of ammonia per ounce (his prescribed evaporation of ammonia at the common temperature in a dustless room being in most localities practically impossible, and if possible resulting only in the loss of half the ammonia).
>
> As the plates, *b*, *c*, *d*, *e*, show the same sensitiveness, intensity, and freedom from stains generally, it proves to my mind, that all interference of preservatives or silver compounds, besides iodide and bromide, is done away with, and we behold the pure sensitiveness of iodide and bromide to light. But a plate having been treated with the strongest ammoniated water, without mitigation by any additional preservative, although the same compact collodion was used, exhibited after drying, the peculiar lustreless dull appearance of a film made with entirely rotten collodion, and in developing brought out the picture unusually quick, but weak, and of a gray leaden hue, resisting all further attempts to intensify. The rottening effect of ammonia on a horny collodion in the bottle is sufficiently well known, and we find the same effect going on here.
>
> In my opinion this effect must be mitigated by gum, albumen, &c., or more reasonably by simply decreasing the strength to one drop ammonia per ounce, and by not allowing the liquid to stand on the plate beyond half a minute.
>
> Perhaps a short immersion in a tall bowl filled with ammoniated water will best answer the purpose, as then the back and the roughened edges of the plate are cleansed equally at the same time.

The committee have dwelt at some length on Mr. Bochert's experiments, and although, individually, they differ in opinion from him on many of the points advanced, yet they consider his communication contains much that is sufficiently novel and interesting to merit the notice of the Society.

Mr. Ackland has made an important statement to the following effect:—

> In many of the dry processes the excess of nitrate of silver remaining on the plate after washing is precipitated as a chloride, citrate, acetate, or other insoluble salt:
>
> A plate so prepared can have its degree of sensitiveness doubled by immersion in a weak solution of nitrate of silver, and and afterwards washed:
>
> It therefore follows, that if sensitiveness be the object aimed at, nitrate of silver should be in excess on the plate.

Mr. Hannaford has been more exclusively engaged in experiments connected with the production of instantaneous dry plates, on which branch the Committee propose entering more fully in their next report on the Dry Processes.

Messrs. Tear, Clark, Leake, Blanchard, and other practical members of the Committee, have been deterred by the weather from prosecuting their experiments as energetically as might be desired.

The Committee have now only to state that early in the coming year, before the season for out-door work begins, they hope to place before the Society a more more conclusive report on this subject.

Proceedings of Societies.

Manchester Photographic Society.

A meeting of this society was held on the evening of the 5th instant, Mr. Parry presiding.

After some routine business, a series of rules for the regulation of an Exchange Club in connection with the society were read and discussed, after which the rules were adopted.

Several of M. Joubert's transparent enamel photographs on glass were then exhibited, and a letter from Mr. Kirby, partner to M. Joubert, was read concerning them. After some conversation, in which the Secretary, Mr. Jabez Hughes, of London, Mr. Pegg, and others took part, a vote of thanks to Messrs. Joubert and Kirby was passed.

Some stereoscopic transparencies on plates prepared by the hot-water process were introduced to the society by Mr. Parry, who, referring to the previous publication of the same method by Dr. Ryley, remarked that he believed the process had never been practically carried out until he (Mr. Parry) had read his paper a few months ago. It was necessary to keep up the temperature of the water during the manipulation, to prevent blistering. He believed that a heat of from 180° to 200° Fah., would give the necessary conditions. The pictures exhibited were considered highly successful.

A conversation on transparencies for the magic lantern followed, in which it was remarked that the amount of density should always be proportioned to the nature, position, and strength of the light used.

Mr. Jabez Hughes remarked, in answer to a question from the Secretary regarding toning difficulties, that the method of toning with the alkaline gold bath required conditions especially suited to it; the most important of which was a fine even surface in the paper to commence with. If this did not exist, the albumen was unevenly deposited or absorbed, and gave rise to unequal toning.

After some further conversation on the subject, in which Mr. Wardly remarked that albumenized paper deteriorated rapidly with age, and when a year or two old would scarcely tone at all, the subject of wax paper came under attention. A general impression prevailed that excellent results might be obtained if proper attention were given to the careful conducting of the manipulations, the point of essential importance being a sufficient exposure, whereby the desired amount of intensity and detail might be secured without the excessive use of silver in the developer. By this means the effect of texture in the negative was reduced to a minimum.

The usual votes of thanks terminated the proceedings.

Glasgow and West of Scotland Photographic Society.

The usual meeting was held on the evening of the 6th, Mr. McLean in the chair.

Mr. Macnab opened the proceedings by a paper in continuation of the subject which had occupied the attention of the society at its two former meetings of this session—positive printing. The chief feature which characterised Mr. Macnab's paper, was a recommendation to photographers to make their own chloride of gold, by which he intimated that a clear saving of something like fifty per cent. would be effected. Australian gold, he stated, could be purchased at twopence per grain; and fifty-six grains of gold would yield about eighty-six grains of chloride of gold. The method of dissolving the gold which he recommended was that given by Mr. Hardwich. A somewhat singular feature of the paper was a statement, contrary to general experience, to the effect that for those negatives abounding in half-tone he preferred printing in a bright light, whilst with dense negatives, giving very decided constrasts, he preferred printing in a dull light. He concluded by some remarks on the recovery of silver from the washings of the prints. There were several ways by which this could be done: by copper, by hydrochloric acid, by salt and liquor of potass, or caustic potass. The two last he preferred, because it involved less trouble in the recovery of the silver.

Mr. Stuart adhered to his formerly expressed opinion regarding the best light for printing in. Within the last three months he had made £20 of gold into chloride, and found it cost him 1s. 9d. for each fifteen grains. In his daily practice he adopted the plan of throwing down metallic silver by copper wire from the various washings, except the hypo bath and washings. The silver so obtained he made into nitrate, by adding nitric acid. To this product he added water, and used it for printing.

A conversation then arose on the use of the silver meter, which Mr. Stuart recommended for ascertaining the amount of silver in the bath, in which Mr. McFarlane, Mr. Bowman, and others took part.

Mr. John Cramb stated his conviction that such meters were useless and deceiving. Their only value would be to ascertain the amount of silver in a bath which had been some time in use, and the specific gravity was no test of the amount of silver, inasmuch as other solid matter present would materially affect the results. The use of a solution of common salt, of known strength, and marking how much was required to precipitate all the silver in a measured quantity of a bath, was a simple method of obtaining a true analysis. He had never used a silver meter; he never felt curious to know what *was in* a bath, so long as it gave good pictures.

After a vote of thanks to Mr. Macnab, a conversation arose on the recovery of silver from waste prints, the hypo-fixing bath, &c. Mr. Stuart had recently obtained silver to the amount of £4 15s. from the waste prints collected in six months. A drachm of gold was also obtained, some of the prints being toned. His method was to burn the prints and fuse the ash with carbonate of soda. It was suggested that Mr. James Cramb should give the results of some experiments on the recovery of silver at the next meeting.

Mr. A. McTear exhibited a print toned by means of the American toning-bath we recently published.

After the usual votes of thanks and some other business, the proceedings terminated.

Dictionary of Photography.*

Printing.—*continued.*—The processes of photographic printing which we have described, all refer to the use of albumenized paper, and are those most largely practised. The processes on plain paper are in most respects similar. Especial care in selecting the paper is necessary, both with regard to the texture and surface, and the mode of sizing. The colour and quality of the print desired will materially affect this question. The continental papers, mostly sized with starch, give black tones; English papers being chiefly sized with animal matter, have a tendency to give brown tones. Those papers which give very dark tones in the printing frame are easily brought to any tone of black or purple in the toning bath; those which print red in the printing frame, rarely become deeper than purple or purple brown in the after processes.

To keep the image as much as possible on the surface many recommend the addition of gelatine &c., to the salting solution. Mr. Hardwich recommends three grains of Iceland moss and one grain of purified gelatine to every ounce of salting solution.

The formula we have used with success is as follows:—

Chloride of ammonia	10 grains
Distilled water	1 oz.

A sufficient quantity of the solution to fill a clean, flat, porcelain dish, half or three-quarters of an inch deep, must be made. The paper, cut to the proper size, is marked with a pencil on the corner of the smoothest and hardest side, which is easily seen by holding the sheet so that the light strikes it at any angle. It is then floated, the marked side downwards, on the solution for three or four minutes. Care must be taken in placing it on the solution that the whole of the surface comes in contact with the water, and that no air bubbles are formed under. Entire immersion for one minute may be used instead of floating. Any quantity of paper can be thus prepared at one time, and preserved ready for exciting. This can be done in daylight.

To render the paper so prepared sensitive, a sufficient number of sheets for immediate use must be floated for about two minutes, salted side down, on the following solution:—

Nitrate of silver	60 grains.
Distilled water	1 ounce.

This must be done in the dark, or by the aid of yellow light, and the sheets suspended by one corner to a lath or piece of cord stretched for the purpose, and hung to dry in the dark. The drying should be effected as rapidly as possible, and it is desirable, therefore, that the temperature of the room in which they are hung should not be lower than 60° Fah. Only the quantity required for immediate use must be excited at a time, as it spoils with keeping. When dry it is ready for the printing-frame, and may be toned and fixed as we have described for albumenized paper.

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* Continued from p. 358.

It is perhaps important to remark here that for plain paper a more intense negative is desirable to produce vigorous results than is necessary for either albumenized paper, or paper prepared by the ammonia-nitrate process, which we are about to describe.

To prepare the ammonia-nitrate paper, proceed as follows:—take

Water	... ...	4 ounces,
Chloride of ammonium	...	20 grains,
Pure gelatine	... ...	5 „

The paper, marked as before, must be immersed in the solution. If rich purple tones be desired, add 20 grains of citric acid and 25 grains of bicarbonate of soda. The paper is then rendered sensitive by a solution of ammonio-nitrate of silver, prepared as follows:—Of nitrate of silver take sixty grains to the ounce of distilled water; dissolve in half the total quantity of water to be used. Then add, drop by drop, a solution of pure ammonia, stirring, meanwhile, with a glass rod. This renders the solution turbid, a brown precipitate of oxide of silver being formed; this, however, is re-dissolved, and the solution clears up as more ammonia is added, care being taken, however, not to add the ammonia in excess.

To make this quite certain, it is well, when the liquid has become perfectly clear, to add a drop or two of nitrate of silver solution until a *slight* turbidity again appears, then add the remainder of the water. The solution should be kept in a dark place.

This preparation should be applied to the paper with a flat brush or a glass rod, and any portion which has touched the paper should not be returned to the bottle. The brush for such purpose should be kept scrupulously clean. The paper should be laid upon a clean board, to be kept for the purpose, rather smaller than the sheet of paper. The solution is brushed lengthwise and crosswise, so as to cover the paper evenly with it, which must be suffered to remain on the board about a minute, and then pinned up by the corner to dry in the dark. If a glass rod be used, which is perhaps best, stretch the paper on the board, pinning the edges over; then lay the rod across the sheet near to the edge, and pour a little of the solution along the side of the rod, which is then to be carried evenly across the sheet, thus spreading the solution evenly as it goes. The ammonio-nitrate paper should be used as soon as prepared, as it rapidly spoils.

Paper prepared by the ammonia-nitrate process is very sensitive, and yields very intense prints with black tones.

(*To be continued.*)

Photographic Notes and Queries.

Mr. Cramb's Albumen Process,

Sir,—I was never more surprised than at the singular interpretation given by Mr. Cramb to the concluding remark in my letter, and the extraordinary outburst which accompanied it. I assure him that so far from knowing him, and knowing him moreover to be a humbug, as he seems to suspect, I never saw him in my life, and nor even heard his name till very recently. I need not add that I am equally unacquainted with yourself, and am equally unknown by you. There has been no breach of confidence therefore either on my part or yours. I am sorry you think that my remark "possesses somewhat of a slighting tone," since nothing was further from my intention. I wrote in a hurry to save the post, or my letter would not have reached you in time for publication, and the sole object I had in view was to suggest to your correspondent, Mr. Richards, who had requested you to induce Mr. Cramb to give the details of his method of manipulating, that as Mr. Cramb had publicly stated in a contemporary journal that "he practised the *old, simple* albumen process on glass," it was not very likely that he would have anything new to tell us beyond what was known to those who practise the process as improved by Whipple, Coale and Archer. This was all I intended to convey. You had appended to Mr. Richards's letter a note which led me to suppose that Mr. Cramb had promised or held out a sort of promise to publish his process. I therefore added "when he publishes his method of manipulating, we shall see," i.e., whether my conjecture be right or wrong. Mr. Cramb is now in possession of my sources of information. His inference that I intended to assure your readers that "his process would be quite worthless" is one which he has no right to make, and which no rational man would make. Neither is Mr. Cramb justified in telling me "that I know nothing of his process, and that it is substantially unknown," when he had been writing about it in a contemporary journal, and there stating that it is "the *old, simple* albumen process on glass," with which I suppose he will give me the credit of being tolerably well acquainted. If he practises the *old* albumen process, pure and simple, then I say we know all about that already, and therefore he can have nothing *new* to communicate respecting it. If, however, he has introduced modifications or improvements into that process, then it is not the *old* and *simple* process, and his statement, already quoted is not strictly true. Any man is liable to be misled by such loose and inconsistent assertions. Mr. Cramb now informs us that he intends to publish *his* process this winter, and "that perhaps after all there *is* something new in it." I am very glad to hear this, and shall welcome any novelty in the shape of improvement in this albumen or any other process, come from what quarter it may. At the same time, I cannot but regret Mr. Cramb's indiscretion in writing a letter, which appears to me so little creditable, that had it not contained an imputation against yourself, which I felt it my duty to remove, I certainly should not have stooped to notice it.—Yours very truly,

An Amateur.

December 15th, 1860.

The Malt Preservative Process.

Sir,—It would appear from Mr. Walker's paper*, that this process is attended with considerable difficulties, the principal one arising from the necessity of washing off every trace of the malt solution prior to development, to prevent stains. It seems by no means an easy task to effect this, and equally difficult to ascertain if any of the preservative be left on the plate. The remedy which suggests itself is obvious and simple. Let the malt infusion be thoroughly washed off in preparing the plates, as in the Fothergill process, before they are reared up to dry; and as it now appears that the plates are not so sensitive as they were formerly stated to be, they should also be immersed in a weak solution of chloride of sodium or ammonium for about a minute prior to the final washing.

The most annoying fact accompanying this process, however, is the very frequent source of failure from the cracking, tearing, and peeling off of the film, and Mr. Macnair is at no pains to conceal "his disgust" at this evil. The remedy will, I have no doubt, be wholly or partially found in washing off the preservative in the preparation of the plates, but should this not entirely cure the complaint, the application of a substratum of dilute albumen is a certain remedy, besides adding to the vigour of the negative. The best proportion is one part of white of egg to two of water.

Plates thus prepared may perhaps develope better than Mr. Walker has hitherto found. The collodion, especially if old and rotten, should contain a full proportion of bromide, in which case iron and citric acid should be employed to bring out the picture, a few drops of acetate of lead solution being added or if this latter be dispensed with, the intensity can be brought up by redeveloping with a strong pyrogallic acid solution in the usual way.

After all, the malt process, though not exactly a failure, does not seem to possess a single advantage over that of Fothergill, or to hold out any inducement to those who have mastered that process to abandon it for the process of Mr. Macnair.—Yours truly,

An Amateur.

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* See report of meeting of Photographic Society of Scotland in our last.

Talk in the Studio.

Stability of Colllodio-Albumen Plates.—Mr. Ackland showed us the other day some exceedingly fine stereo-transparencies of Indian scenery produced from negatives recently brought over by an amateur. The most peculiar and interesting feature in the case, however, was the extraordinary keeping qualities of the plates from which the negatives were produced; some of them having been kept after excitation, quite *ready for the camera for upwards of twelve months*, and that in the high temperature of an Indian climate. The majority of them were exposed at a period of about four months after the final sensitizing; and with such perfect success, that a few were kept for experiment until after twelve months had elapsed, and were still found good. The plates were prepared by the usual Taupenot process with Major Russell's modification: that is after the final sensitizing in the aceto-nitrate bath and thorough washing, they were placed in a dilute bath of salt and water for half an hour, to convert the remaining free nitrate into an insoluble chloride, and after that treated with a solution of gallic acid. We commend a more extended practice of this method to collodio-albumen operators where keeping qualities are desired. See some remarks on the subject under the head of "Notes and Jottings" in our last.

The Petschler and Mann Process.—Reference was made to this process at a recent meeting of the American Photographic Society, when several members stated that they had had tried it, and confirmed the results obtained by the discoverers on this side the Atlantic.

Poisoning by Cyanide.—An investigation was recently held before Mr. Brent, at the Duke of York tavern, New Church-street, Lisson Grove, in reference to the death of a young married female, named Eliza Fox Ashee Sheen, aged nineteen, which took place at an early hour on the morning of Friday, the 28th ult., from the fatal effects of cyanide of potassium, administered under mysterious circumstances. After hearing additional evidence, the following special verdict was returned:—"The jury find that deceased died from the mortal effects of cyanide of potassium, but by whom administered there is no evidence to show. The jury cannot separate without publicly expressing their regret that no clause was introduced in the bill recently passed for the sale of poisons to prevent the facilities which now exist of procuring (without licence or restriction) such rapid and deadly poison as that which has caused the death of Eliza Fox Ashee Sheen, and who, in the opinion of the jury, might have been now living had such restriction been placed upon its sale. Further, they beg to recommend to all chemists and druggists, not to supply cyanide of potassium but to persons only who are known to use it for business purposes, or upon their written orders, whose signature should be indisputable."

South London Photographic Society.—The usual meeting of this society was held last night at St. Peter's School-Rooms, Walworth Road. The discussion on instantaneous photography and composition printing, a paper on some optical principles involved in the manufacture of photographic lenses, and a report of the Experimental Committee occupied, the attention of the meeting. Details in our next.

Hughes's Dead-Black Varnish.—This is one of the best articles for the purpose for which it is intended that we have met with. It is easily applied, dries quickly, and from its toughness and texture seems to give the best possible assurance that it will not crack. It is recommended not only for blacking glass positives, but for blacking the insides of cameras, brass-work, &c. It is also said to be useful for "stopping out" skies in negatives. Where this is to be done, we have no doubt but this varnish will answer the purpose admirably; but we should be glad to think that the occasions for such a step are gradually becoming very rare.

The Crystal Palace.—A most attractive programme of amusement and instruction is offered at the Crystal Palace for Christmas Day and the ensuing week. When lighted up at dusk the visitor may fancy he is enjoying a promenade in fairyland. The picture gallery, which will be most interesting to our readers, has recently had some valuable additions.

New Stereoscopic Effect.—

"We laughed, made speeches, drank for joy;
Champagne hath STEREOSCOPIC charms;
For when nurse brought our little boy,
I saw TWO babies in her arms!"—*Punch.*

To Correspondents.

Volume Four of the Photographic News will be completed in our next number, which will contain the title and index. In order to avoid the exclusion of the mass of important matter at present in hand we shall in the next number give our readers four extra pages of matter. The new volume to be commenced in January will contain several new and important features, amongst which we may mention a series of articles on "The Technology of Art as applied to Photography;" a series of practical articles on Instantaneous Photography, Printing Transparencies, &c., &c., together with other novelties, arrangements for which are now pending.

W. A. Smith.—We do not know of any firm requiring photographs of India; but should we hear, will place your letter in the proper hands.

M. L. B.—Your picture is badly lighted, over-exposed and under-developed. We see no reason to suppose that the fault rests with the bath. See articles on the "Positive Process" pp. 231 and 245 vol. iii of the Photographic News. Do not use carbonate of soda to neutralize excess of nitric acid in a positive bath; but oxide of silver. The picture you forward is not fogged in the usual sense of the word, but is a very dull, flat-looking affair. You want considerably more shadow: an equally diffused light all round is very unsuitable for portraiture. Expose less and develop considerably more; you may also try using your iron developer over again instead of always using it fresh. Gum dammar dissolved in benzole will not crack but it is apt to bloom. See "Varnishes and Varnishing" in the present number.

Juvenis.—We do not understand the nature of the brown patches to which you refer on varnished negatives; as we have never met with any thing of the kind; if the negatives had been unvarnished it might have proceeded from oxidization of the surface, caused by moisture, or from contact with silver in the sensitive paper. 2. You do not state the nature of the varnish you wish to dissolve, which is one we have not met with. If it be a spirit varnish alcohol will be the best solvent, but it is very difficult to remove a spirit varnish entirely. Benzole will dissolve most other varnishes.

Mega.—There are a few of volumes 1, 2, and 3 of the Photographic News left; but only three or four copies. You will find much of the imformation you require therein. The views required for the magic lantern are transparencies. Our columns will shortly have details of the best method of production, and also some particulars regarding the oxyhydrogen light. Your half-plate lens may be used in a lantern.

James L.—Iodide and bromide of silver used at one time to be added to the collodion, but that method is now rarely adopted. The iodide and bromide of some base is added to the collodion, and the requiredsalts of silver are formed in the film by double decomposition in the nitrate bath. 2. Yes. 3. Always use the developer fresh.

F. P.—The works on chemistry are almost innumerable. Wilson's Chemistry in *Chambers' Educational Course* is a very valuable one for a beginner. You will find the fullest information on Photographic Chemistry in the series of articles on that subject in the former volumes of the Photographic News and in Mr. Hardwich's "Photographic Chemistry."

Bewildered.—The time required for development varies considerably. In the wet collodion process from a few seconds to a few minutes being sufficient. We prefer a positive to require about thirty seconds, or more; and a negative about two minutes. In the dry processes, especially where gallic acid is used for development, it sometimes requires several hours.

M. M.—We have purposely abstained from any comment on the discussion on centring lenses. Mr. Ackland will explain the method to which he referred. Had he not done so, we should have given our readers a method whereby photographers may ascertain for themselves, without the use of mechanical appliances which they do not possess, how far their lenses are properly centred. The method to which we refer will, we believe, be explained by Mr. Ackland, and we think it is only fair under the circumstances to allow him to do so, without being forestalled. Exact accuracy is, however, of less importance in photographic lenses than has been represented. In telescopes where the different lenses of the combination are so far apart, and the image is a magnified one, the exact coincidence of the various axes of the lenses is important, but in photographic lens producing a diminished image, and having the lenses at a comparatively small distance apart, it is of less importance. We have in use now a portrait lens in which the coincidence is not perfect, but which is, notwithstanding, excellent in performance

F. G.—Phosphate of soda is a basic neutral salt, but has a decidedly alkalin reaction. The common tribasic phosphate is meant.

G. B. C.—Opinions vary as to which is the best dark tent. There are man excellent ones advertised. Leake's is one of the lightest, simplest, an cheapest that we have seen. For information as to building a glass hous see Vol. iii. p. 73 of the Photographic News.

Amateur in a Fix.—The white spots you describe usually arise from imperfection in the collodion. In your case the addition of a drop or two of nitric acid the silver bath will probably remedy the evil.

M. A.—You will find some useful information on making dishes under th head "Amateur Mechanic" p. 261 of our third volume. Marine glue, o shellac dissolved in methylated spirit, will answer your purpose, and ar not acted on by the solutions. A Ross's landscape lens made four or fiv years ago is not obsolete. You may purchase with safety if you are certai it is one of Ross's make; but remember there are many spurious one bearing his name in the market.

A. L. G.—We have met with, in our own practice, a case where a bath workin well one day the next refused to give even tolerable results; and hav been entirely unable to account for it, even when we knew the whole hi tory of its manufacture, age, and treatment. Of what material is the bat in which your solution is kept? What collodion do you use? We have cure a similar bath by sunning in an open vessel, and then filtering an strengthening. The portraits are decidedly fine: the vignette head is ve familiar to us, but we cannot at this moment remember the owner.

Dilemma.—The case is not so bad as you fancy. The cracked black varnis may easily be removed from your positive. Scrape it away carefully wit a knife; it will come off very easily. A little turpentine or benzole w assist you if you find it obstinate. When quite clean, apply a varnish th will not crack. It is useless to attempt to fill up the cracks as you p pose, as they would always show.

N. N.—We do not know of any method of removing stains from a photogra which have arisen from acidity in the gum or paste with which they a mounted. We prefer the use of fresh starch.

O. O., R. J., and W. C.—In our next.

THE PHOTOGRAPHIC NEWS.

Vol. IV., No. 121.—*December* 28, 1860.

ON SOME OPTICAL PRINCIPLES INVOLVED IN THE CONSTRUCTION OF PHOTOGRAPHIC LENSES.

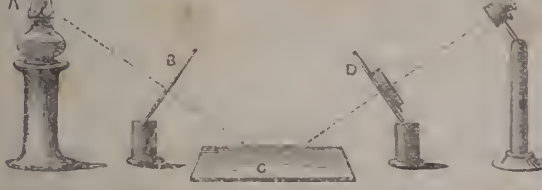
BY WILLIAM ACKLAND.*

The subject I am about to bring before the notice of this meeting is one of considerable importance, and merits a very careful consideration, by both the photographer and optician, and will consist of a description of the optical means employed in the manufacture of photographic lenses under my superintendence, by Messrs. Horne and Thornethwaite; but before doing so, I should remark that I have but little that is new to offer you, my object being to bring together for publication certain means that are but little used, and perhaps unknown by many, so as to disseminate for the general good, information that has been practically applied by myself for the last six years, and found thoroughly efficient.

In the construction of photographic lenses, the first consideration is, to obtain "optical discs" (as they are termed) of first-rate quality, free from striæ, wavy lines perfectly homogeneous and properly annealed.

To ascertain if any of these defects exist, is an object of some importance in a pecuniary point of view, as, should they be detected on any after-stage of the manufacture, the honest trader would at once reject it as valueless, and thus not only lose the original cost of the disc, but also the labour bestowed on it; whereas if these defects had been detected at the outset, the prime cost of the glass would be his only loss.

In order to detect these defects, the disc is very carefully examined by looking through the facet, polished on its edge by the maker, with a view to ascertain if any striæ exist. If none are visible, it is next covered with a varnish, to render the rough surfaces more transparent, or is ground and roughly polished on both sides: the object of this is that any wavy lines or striæ that may be invisible by our first mode of examination may be thus brought to light. If a careful examination shows us nothing objectionable, the disc is next examined by polarised light, to ascertain if it is perfectly homogeneous, and carefully annealed. To accomplish this we require an apparatus similar to fig. 1, where A represents a lamp used as a source of light, B a sheet of glass ground on one side, and employed here for the purpose of diffusing the light before it falls on the plate C. This plate, C, is made of ordinary glass, the under side of which is coated with black varnish, or Bates's jet, and is so placed that the light from the lamp A, after passing through B, shall fall on it at an angle of about 33°. After falling on the plate, the rays of light are reflected in a polarised state, towards a Nicol's prism, situated in the support at E.



The plate of glass at E is merely for the purpose of supporting the disc of glass to be examined.

If we place the eye at E we shall find that the amount of light reflected varies on rotating the prism, and that at certain positions of the latter, none whatever is reflected, as what was before the field of view is now total darkness, the light having suffered what is termed polarization.

The apparatus being thus arranged, so that no light is reflected, if we place an imperfectly annealed piece of glass on the plate D, and again apply the eye so as to look through the prism E, we shall find, instead of darkness, that the glass is illuminated, and shows a rich and gorgeous display of the prismatic colours, and the more carelessly the annealing has been done the more brilliant the colours; but if we introduce a disc of glass that has been properly annealed, no colour is perceptible, and the field of view is totally dark, as before its introduction.

This mode of examination frequently brings into view wavy lines and striæ, that are perfectly invisible by ordinary light.

Having ascertained that the discs of glass are free from any defects, they are next handed over to the glass grinder, and those intended to form *convex* lenses are ground and polished in the usual manner, and are then ready for centring. The object of this is to render the lens perfectly circular, and to make the axes of the two spheres of which the surfaces are segments in the same straight line, and much of the correct working of a lens depends on this being properly done. The mode of centring is well known, and consists in attaching the lens by means of pitch and a clinch to the mandril of a lathe, and whilst the pitch is still warm enough to be pliable the position of the lens is changed by a pressure of the hand, or with a fragment of wood, till, by revolving the mandril, as in turning, any object seen by reflection on its outer surface, remains steady to the eye during the revolution. If this is not the case, the workman by practice judges what is wanted, and either lowers or raises the lens on the pitch, or inclines it a little more or less, until by repeated trials the objects seen both by reflection and refraction, remains stationary during the rapid revolution of the lathe; he then concludes that the lens is fixed centrally, that is, that the two axes coincide, and it only remains to cut it down to a perfect circle of the proper size.

To effect this the lens is left until the pitch is quite cold, and then the workman turns the lathe with his foot very rapidly, and being provided with a plate of copper, covered with coarse emery moistened with water, he applies this at a fixed distance from the centre of the lens, so that the parts most distant from the centre rub pretty strongly against it. By these means the prominent parts are soon reduced. He then approaches the plate of copper a little more, and thus removes the next projecting parts, and so on till he has ground the rest of the prominent parts down, and produced a most complete circle, which must, when the lens is properly centred, be of equal thickness all round. The lens is now finished, and after removal from the lathe is washed with turpentine, to remove the adhering particles of pitch, and is then ready for use.

Concave lenses are usually centered in the same manner; but I must confess that, from the first moment I turned my attention to the construction of lenses, I saw that great difficulties must be experienced in properly centering a *concave* lens by this plan, more especially if one surface is nearly flat; and as the front lens of the portrait combination and the first surface of a view lens are both nearly flat, it was very important that some other plan should be adopted, and I devised the following one, which I have found to answer admirably, in all cases.

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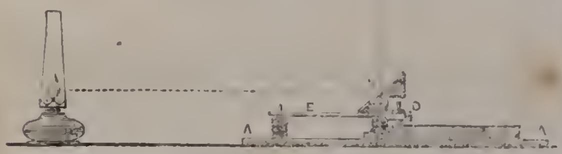
* Read at the Meeting of the South London Photographic Society on Thursday the 20th instant.

The importance of centring a concave lens by some other and better plan than the one usually adopted will be apparent to any one who tests a few lenses by the plan I shall hereafter describe, as I will venture to assert that out of every six portrait lenses that are imperfectly centred, five of that number will be found to be defective in the concave lenses, and most probably four of that number will show a want of accurate centring in the flint lens of the anterior combination.

The disc for a double concave lens, after being examined as before described, is first edged down to the size of the required lens, in a manner exactly similar to that employed in edging down the finished convex lens, and is then removed from the lathe, and ground perfectly level on both sides, and reduced to an even thickness all round.

To ascertain if one part is thicker than another, an instrument I have termed an indicator is employed, the construction of which will be apparent by reference to fig. 2.



where A represents an iron base perfectly flat; above this is an axis working on centres, one of which is shown at C; this axis has attached to it two arms, into one of which, D, (the shortest of the two) is inserted a screw working vertically, and underneath the point of which the edge of the lens to be tested is placed. The other arm, E, extends backwards for a couple of inches, and has a spiral spring under it. so as to raise it, and thus to depress the arm, D, and keep it in contact with the lens under trial. Attached to the axis is a mirror, placed in an angle of 45°. Now it is evident, that if we cause a beam of light to fall on the mirror, by using a lamp properly so placed that such beam of light will be reflected upwards to the ceiling of the room in which the the experiment is tried, and that we may consider such a beam of light as an inflexible and prolonged arm, having an axis at C, and a short arm at D, and that if we raise or depress the arm D the smallest fraction of an inch, such movement is instantly visible by the reflected image on the ceiling varying its position; hence it is evident that if we place our flattened disc under the arm D, and then rotate it, that if the disc is of uniform thickness, the image on the ceiling will remain perfectly stationary; but if our disc is even the one-thousandth of an inch thicker on one side than the other, the varying position of the image will detect it with certainty. If the extreme delicacy of this instrument is found objectionable, we may dispense with the beam of light and mirror, and prolong the arm E some six or seven inches, and place before its end a divided scale. As a depression or raising of the arm D will cause a reverse movement of the arm E, and thus the uniformity on the thickness of the disc would be shown, but in a less accurate manner.

The disc of glass, now of uniform thickness, is next ground on a convex tool of the required curvature, until the spherical cavity formed extends to near the edge, but the workman is very careful to leave a slight ring of the previously flattened surface undisturbed. This circular annulus, or ring, is a guide to enable him to keep the axis of the curvature exactly at right angles to the surface of the disc; for should the ring be thicker at one side than the other, it is evident that the axis cannot be in its proper position, and must be corrected accordingly.

When the lens is correctly ground to the required curvature, it is polished as usual, but needs careful examination, from time to time, to ascertain that the accuracy formerly attained is not destroyed by uneven polishing.

However careful a workman may be in grinding and polishing a lens, it often happens that at some stage of the process a particle of grit or of emery will get on his tool or polisher, and scratch the surface so deeply that, in order to remove it, the circular ring must be entirely removed. When such is the case, the indicator must be employed from time to time during grinding and polishing.

Both sides of a double concave lens are treated in exactly the similar manner; but for the concave-convex lens of a portrait combination we must proceed differently.

In this case the disc of glass, after testing as before described, is edged to the required size, and the convex side ground and polished in the usual manner. After this the disc is rendered of uniform thickness, and such thickness verified by the indicator, and the concave surface is then worked with the precautions before described.

I have thus shown the optical means employed to form each lens with accuracy, but we have still to guard against any errors that may arise from a defective brass mounting or in imperfectly turned cells, and we must not consider our examination complete until we have ascertained that not only the lenses, but even the brass mounting in which they are fixed is accurate.

To do this is easy, and any errors can be instantly detected, whether caused by the glass grinder or the brass finisher, and even the defected surface or cell pointed out.

The plan I adopt was invented by Dr. Woolaston, and read before the Royal Society, on the 13th December, 1821. The title of the paper is, "On the Concentric Adjustment of a Triple Object Glass," and in it the learned author says, "Having in my possession a telescope with a triple object glass, on 45 inches focus, made by Dolland in 1771, I have had a good opportunity of examining the central adjustment of the lenses, and have made trial of a method of correcting that adjustment, which appears not to have been used for that purpose. When I ventured to take to pieces an adjustment that had stood the test of fifty years trial with uniform approbation of its performance, those who know the telescope, and who know the difficulty of centring, seemed to consider it an act of rashness which I was likely to regret; but by the test I am about to describe, I felt confident that my object glass was capable of improvement, and I rested my hopes of success on principles that seemed indisputable.

"When any bright object is viewed through a glass of this construction without an eye glass, there may be observed at the same time as the refracted image a series of fainter images that are formed by two reflections from the different surfaces; and as the position of these images is dependent on the curvature of that pair of surfaces by which it is formed they appear at different distances from the object glass.

"Since the number of surfaces is six, the number of binary combinations of these surfaces is fifteen, and just so many images formed by reflection may be discerned.

It is manifest that if the glasses be duly adjusted to each other, so that the axes are correctly coincident, then this series of images must be all situated in the same straight line; and conversely, that any defective position may be immediately detected by a derangement of the line of images."

The author then goes on to describe the formation of the various images, and an engraving, published with the paper in the Transactions of the Royal Society, shows the displacement of certain of these images, by one or other of the lenses being out of adjustment, and in conclusion states that the telescope, when finally adjusted by this plan, was so much improved, that "the actual limit to its powers cannot be fully assertained, excepting under such favourable conditions of the atmosphere as do but rarely occur."

In order to apply this to test our portait lenses, all we have to do is to place a candle at a distance of about seven or eight feet, and then holding the lens in the hand, or supporting it on a stand, if we look through it we shall distinctly see fourteen of the reflected images as shown in

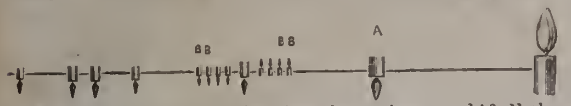


fig. 3, and of the comparative sizes there given, and if all these images are in one straight line we may pronounce such lens properly centered, but if they appear scattered to the right or left, such lens is defective.

It may be mentioned that fig. 3 shows the images as formed when the front lens of the portrait combination is next the eye, and that to observe these images properly the eye should be placed at a greater distance from the lens, that its focal length, and also that the first image next the candle is the one that is often out of its true place in lenses otherwise properly centered.

I mention this last fact, as in many cases I have discovered that the surface here out of place is that of the front flint lens, and it is no doubt caused by the cemented pair of lenses not accurately fitting the cell, and the softness of the balsam has allowed the lens to drop a trifle after leaving the maker's hands. Such defects can be remedied, and the lenses much improved in action.

I have now, gentlemen, given you a rough outline of a few optical means found useful in the construction of lenses.

Of course you are all aware that one part of this paper is a description of a plan that at one of our meetings I designated a "trade secret." How far I was justified in doing so, I leave you to judge; but this much is certain, that the plan now described is unknown to many; and the worthy editor of the *British Journal of Photography*, who attacked me, was amongst that number.

It is true he has since been told something of the principle which he designates a rough method; but when we find that, on looking through a portrait lens, there are fourteen reflected images *easily* seen, and that a fifteenth exists, whilst he states the number to be six, I think we may conclude he has never tried the plan, and that his assertions are mere hearsay.

However, as he states, he will allow me to have the last word: I can only use his own expression, by saying, I "will let him down easily," and thus close the discussion.

Before sitting down I may mention that some years ago, and prior to my accepting the situation I now hold, I was occasionally employed by two importers to select into classes a very large number of French portrait lenses, and in doing so I made use of Woolaston's method to test the centring; focussed a luminous speck situate obliquely to ascertain the amount each lens would cover, and to ascertain the coincidence of the chemical and visual rays. I examined the state of the lens as to "correction for colour," by viewing the image of the luminous speck by a Ramsden eye-piece.

These examinations were rapidly made, and the lenses distributed into one of three classes. Those I considered fit for No. 1 class were sold at comparatively high prices, as first-rate lenses; and to prove that the plan I followed was successful, I can, with confidence, state that not one of these lenses was ever returned as defective, or even complained of; and although my charge for making such selection was such as to pay me very handsomely, I think my services would have been made use of to this day, had my time been my own to apply it for such purposes. I mention this to prove that Woolaston's plan is not to be considered either rude or complicated.

HINTS ON "KEEPING"—In Composition Photography.

BY ALFRED H. WALL.*

The question of composition printing is not only a mechanical but *an artistic one*. The mere process of printing from several negatives to form one picture is simply a mechanical one and will depend for its success upon the skill and ingenuity of the operator, who may produce a paste-and-scissors affair; "a thing of shreds and patches," offensive both to common sense and good taste, or one in which the joinings are so artfully concealed as to be invisible to any but a more than ordinarily experienced and careful observer. But it is now my purpose to show that even when the highest mechanical success has been attained, and no cruel lines cut up the affair into mere patchwork, there are yet other considerations of far higher importance to the real pictorial value and high character of such productions.

The most legitimate method of using more than one negative for a single picture is undoubtedly that to which Mr. Fry applies them, when printing in skies to marine views or landscapes; but the operation is one which must not be undertaken without a thoughtful study of nature, and extreemely careful manipulation in the printing process. In the first place then, I would suggest to Mr. Fry that in procuring transcripts of so difficult a subject as water in motion, an exposure more absolutely instantaneous than that he adopts would be an advantage. I think if he compares a strictly instantaneous picture of waves to some of his own productions, he will find that, while his own have lost somewhat of that characteristic beauty of form and detail in which the more striking truthfulness and effect of such a subject lies, the former will have a clear crispness of outline and detail which is pre-eminently eloquent, in their fantastic and continually varying forms, both of the material and of its various peculiarities. Although no advocate for extreme sharpness in general landscape, I have frequently observed that the least woolliness in the outlines of moving water goes a very long way towards destroying its truthfulness of effect. More particularly will this be perceptible in what artists call accidental waves, viz., waves which are influenced by such accidental causes as the inequalities of the shore, and by rocks or other impediments which not only cause them to rise or leap to a greater height before bursting; but also originate a great number of broken waves which are decidedly of keen-edged jagged forms, and should be represented with clear definition and distinctness in the photograph.

"The Heavy Sea at Brighton," which Mr. Fry exhibited in illustration of his paper, is I think open to the objections I have brought forward, due, as I venture to state, to an exposure, which, considering the actinic influence of water in light, and its rapidity of change in assuming diverse forms, was too long; but it should be remembered that no greater accumulation of difficluties can exist to baffle the most expert and artistic photographer, than those Mr. Fry has so boldly undertaken to combat. I find, in a work by an authority among our landscape painters, the following remark. Speaking of the treatment of water, he says, "Softness and obscurity in outline is to be avoided here, more even than in clouds, as without clear and firm edges no transparency can be obtained: and, although in looking at the foam and spray of waterfalls or cataracts it is not easy to see how such broken forms can be produced by laying on tints with defined edges, a careful examination will prove that there is no other means by which a good conclusion can be attained." The foam in the picture I have called your attention to has no real shapes or forms, which, however great the apparent confusion arising from the mistiness of the drifting spray, certainly existed, although changing so rapidly and in such minute fractions of time, as to defy any exposure but one more strictly instantaneous to seize their real appearance.

Turning now to Mr. Fry's cloud negatives, I would impress upon you the necessity of securing, for every composition picture you may undertake, the identical sky which may be associated with it in nature. Every scene will be affected to no small extent by the character of the sky under which it appears; and this being the case, as it is acknowledged to be by all authorities you will understand what subtle and delicate modifications of aerial effect, and what tender gradations of chiaroscuro must arise from the various atmospheric conditions as indicated by sky and cloud. To print in *any* sky to *any* landscape will therefore be erroneous in principle, although it is very possible that an artistic and scientific observer of nature may do so with impunity, defying detection. I remember seeing a composition print not long since which put a landscape, taken on a clear, bright, sunshiny day, in a pure and colourless atmosphere under a sky full of low-lying vapours, and masses of misty cloud. It had been shown and admired among certain photographic circles, without the detection of its funny mistake, which is only one of the many proofs I could name of the great absence of, and urgent need for, artistic culture in the practice of our art.

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* Read at the Meeting of the South London Photographic Society on the evening of December 20.

If this be the case in obtaining a sky and cloud negative, under ordinary circumstances in-land, how much greater becomes the necessity of securing the sky and landscape at the same time, when photographing marine views. Every variation in the glorious dome above is reflected in, or has its influence upon, the eagerly sympathising surface of the water beneath. The seemingly wayward humours of reflection and hue, which are continually changing on its mirror-like surface, or even sometimes in its mysterious depths, have their origin for the most part in the no less wayward variations above; and the placing of a sea under a sky foreign to it in character, is so destructive of harmony and truth, that even where undetected by the eye, it will be repulsive to that instinctive recognition of truth, which so often makes an ignorant observer just in his judgment, although erroneous in the words or ideas in which it is intended to be expressed. Nor let it be thought that such reflections upon the surface of water can be so readily accounted for that they are easily imitated. Apart from certain atmospheric characteristics peculiar in their harmonious effect to both sky and water, but more nearly related to perspective; the mere question of simple surface reflections involve a number of very complicated scientific considerations. How often do we see certain portions of clouds and sky, or certain objects on the shore, reflected in a most unaccountable way on the surface of some lustrous lake's clear surface, while other things, which you would certainly expect to see in such a mirror, are as singularly absent. How often are we, despite the recognised optical laws which govern reflexions generally, compelled to recognise the existence of disturbing circumstances which baffle foregone conclusions and defy ordinary calculations. I, and doubtless most of you, have been perplexed by such singular operations of nature more than once. The height and position of the clouds, the height of the camera (or eye of the spectator), the density of the atmosphere, and a thousand other chances seem to influence such effects in their wondrous diversity of changes. The licence, therefore, of using one sky for combination with several sea or land views is, to say the least, a very dangerous one, and one which I don't think a society with any artistic pretensions should encourage. To conclude, I should recommend that where you adopt the practice of composition printing to secure natural skies in your pictures you should for the sake of good taste and artistic truth, take your sky at the time you secure your landscape.

Correspondence.

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FOREIGN SCIENCE

(From our Special Correspondent.)

Paris, 26th December, 1860.

At the north western extremity of the Ægean Archipelago, that sea is indented by a large peninsula, which terminates in three remarkable smaller peninsulas. The most easterly of the three is the peninsula of Athos, about forty miles long by four miles broad: it is mountainous, and cut by numerous ravines. At the foot or the extremity of the peninsula stands the mountain which has given to it its name. Mount Athos is about 6,300 feet high. It is altogether a unique situation, and has therefore been an object of interest both to ancients and moderns. The Christians early regarded it with religious veneration, and built upon it many chapels and places of devotion, some of which may be dated back as early as the time of Constantine. The monasteries of this mountain are twenty in number, and some of them are surmounted by high turrets, they have been the depositaries, in several instances, of very valuable libraries, well-preserved treasures of which have made important additions, within the last century, to our Greek classic literature. The number of monks in these convents is estimated at 8,000. The mountain, and, indeed, the whole peninsula, is called the "Holy Mountain." No female, not even of animals of any kind, is permitted to enter the peninsula. The monks devote themselves to a life of the most rigid asceticism. Mount Athos is a perfect treasury of early Christian art, the contents of which have been preserved intact. Several years ago Monsieur Durand, who visited it, obtained a copy of a curious manuscript—A Manual of Iconology, containing formulæ, or "practical instructions," for missal painters and others, for treating of every scriptural subject from the Creation to the last chapter of St. John's Revelation: together with numerous recipes for the preparation and employment of all the material of the painter's craft. Art literature can show no more curious or interesting work than this same manual: its quaintness and simplicity were quite fascinating and amusing, and it formed the very beau ideal of Pre-Raffaellitism. But the treasures of Mount Athos must have ever remained a sealed book to the world, had not the aid of Photography been invoked: a few fac-similes and descriptions were occasionally doled out to us by favoured travellers, but now, M de Sevastianoff—whose name must be familiar to you, as one of the most accomplished photographers—has returned, after three years residence at the monasteries, which period of time has been zealously devoted to photographing the wonders and marvels of this interesting spot. He has brought with him no less than 4500 negatives, which include every object of interest—views, of the convents with all their curious and interesting architectural features and details; manuscripts of the greatest antiquity, paintings produced centuries ago, all have been copied with the scrupulous fidelity peculiar to photography. There are entire manuscript Bibles, reproduced page by page, with all their naïve illuminations; complete plans of churches by unknown architects, and geographical maps which date from the earliest Christian times. There are also collections of splendid initial letters, copied from manuscripts of the highest antiquity, together with church ornaments and costumes of various epochs. Without question, these intelligent labours of M. de Sevastianoff form one of the most curious, and important, if not the most valuable contributions to art and archæology hitherto made by photography, and it is most devoutly to be hoped, that M. de Sevastianoff will be induced to publish these unique productions, and not confine them to the narrow sphere of a museum or portfolio.

The Société Industrielle de Mullhouse recently offered a prize of £700 to any one who would utilize a cheap and efficient substitute for albumen, of which so large a quantity is used in calico-printing. This substitute has been found by M. Hannon in the gluten of wheat-flour, which is almost a waste product in the manufacture of starch. Wheat gluten was carefully analyzed by Dumas, and afterwards by other chemists: it consists of four substances—glutine, fibrine, albumine, and caseine, which, although distinct, are so analogous, that we are tempted to believe them isomeric, and capable, by a slight effort of nature or of art, of being transformed into each other. By the fermentation to which M. Hannon submits the gluten, he converts it entirely, if not into albumen, at least into an albumenoid substance or glue, which has all the useful properties o albumen.

He takes the gluten, and washes it several times in water as hot has the hand can bear; it is then placed in pans or troughs, and exposed to a temperature of 60° to 75° F., the ordinary temperature of fermentation. Under these conditions the gluten ferments, and the fermentation manifests itself by passing from a relative solidity to a relative fluidity: when it becomes so fluid that the finger can divide and pass through it without difficulty, the transformation into glue is effected, and the operation in a measure terminated. The transformed and liquified gluten is then poured into moulds, which are placed in a stove heated from 77° to 86° F.; after twenty-four to forty-eight hours, the upper layers of the moulds have become hardened, the layers are removed, placed dried side downwards upon cloths or wire gauze, and then returned to the stove, and in the course of four or five days they become quite dry. The albumenoid glue, in solid cakes, is then ready for sale. It is a little hygrometric; but the water it absorbs does not alter it, nor remove any of its good qualities. It only remains to dissolve it when required for use. Broken into small pieces, it dissolves in twice its weight of cold water, slowly but continuously, in an interval of time varying from twelve to forty-eight hours; if reduced to powder by trituration in a mortar, it will dissolve almost instantaneously in twice its weight of water. This forms a normal solution; it will require to be more or less diluted according to the purpose for which it is required. These applications are more numerous than could have been expected or believed: it can be used for gluing pieces of wood; for mending china, glass, pearl, tortoise-shell, &c.; in the sizing of textile fabrics and paper; for clarifying beer, &c.: in gumming silks, &c.; for fixing the colours and as a mordant in calico-printing, &c.; fully replacing animal albumen at about one fourth its price. It has been fully put to the test at Suresne and other places, and adopted to the entire exclusion of the albumen of eggs. When it is considered that the consumption of eggs in calico-printing amounts to many millions annually, it will be seen that this discovery of M. Hannon's is not only a boon to the arts, but also a benefit to the community at large.

M. Jacobi having been appointed by the Russian government to test the new mode of working platinum, proposed by Messrs. Deville and Debray, and ascertain if it possesses any advantages over the old process by by the moist way, reports as follows:—1st. That the two methods of treating the crude metal platina, either by cupellation or by direct fusion, yield products of equal beauty, with no difference in their physical qualities. 2nd. That the preference to be given to one or the other of these methods, with regard to economy, depends on the price of the materials, and upon secondary circumstances, which belong not to science but to industry. 3rd. That treatment by the dry way gives a natural alloy of platinum, iridium, and a little rhodium, superior to platinum in density, elasticity, and resistance to chemical agents. As to its malleability and ductility, this alloy yields in no respect to the platinum hitherto obtained by agglomeration. The artificial alloys of 80 per cent. of platinum, and 20 per cent. of iridium, are perfectly ductile, malleable, and almost insoluble in *aqua regia*. 4th. That by the new new process $14\frac{2}{7}$ per cent. more of useful metal is obtained than by the old method; at the same time the expense of working is much less than in treating the metal by the humid way, especially when old platinum in cuttings and waste is adopted: the re-melting of these matters occasions only a very trifling expense, while previously they could only be turned to profitable account by submitting them to almost the same treatment as the crude metal. 5th. That the fusion of the platinum can be effected upon any scale whatever: in a single operation, 70lbs. of platinum were melted in one hour and twenty minutes, with an expenditure of 415 gallons oxygen, the greater portion of which, even, was consumed at the beginning of the operation in heating the furnace to the requisite temperature. 6th. That the natural alloy of platinum and iridium is admirably suited to coinage, and alloys more rich in iridium may be employed.

Proceedings of Societies.

South London Photographic Society.

The usual monthly meeting of this society was held at the St. Peter's School-rooms, on the evening of the 20th instant. The Rev. F. F. Statham, B.A., F.G.S., President of the society, occupied the chair.

The minutes having been read and confirmed.

The Secretary said he had received several letters complaining of the photographic and scientific blunders which had appeared in the report of their proceedings published in the *British Journal*. He had no wish to dwell on the subject, but it was to be hoped, both for the credit of the society and of the *Journal*, that such errors would not be repeated.

He now had some specimens to lay before them. Mr. Bayley had forwarded some charming specimens of the turpentine wax-paper process, executed by Mr. Hooper. He had much pleasure in stating, that both these gentlemen were provincial members of this society. He wished Mr. Bailey's example were more frequently adopted by others associated with the society in carrying out its purposes, and took this opportunity of appealing to them, and reminding them that the society regretted their silence, and that its Secretary would be very happy to correspond with them, or undertake any small commissions for them in London. From Mr. Hooper especially they would be glad to hear. He now laid the specimens sent before them, assured that they would claim for the gentleman who produced them no scanty meed of praise.

Mr. George showed some specimens of reproductions, which were much admired. He said the qualities which distinguished them were due to iron development, the formula being ten grains of protosulphate of iron, ten minims of acetic acid, ten minims of alcohol, and one minim of strong liquor ammonia to one ounce of water. The negatives were produced in a neutral bath, having about one drop of caustic potash to about six ounces of silver solution. The utmost possible density might be obtained in the negative.

In a conversation which followed, Mr. Hughes remarked, that he should not like the idea to go forth which Mr. George's last remark was calculated to suggest, namely, that excessive density was the consequence of such a developing solution as had been described, the natural tendency of which would be to give softness rather than intensity. The latter quality must be due, therefore, to the peculiar quality of the collodion, and the strict neutrality of the bath. It was important to attribute effects to their right causes.

Mr. Hughes then proceeded to reopen the discussion on Mr. Fry's paper on "Instantaneous Photography and Composition Printing." He preferred to address himself to the latter part of the question, particularly to Mr. Fry's suggestion as to the production of a higher order of artistic pictures by printing in portions from different negatives. After some eloquent preliminary remarks, and glancing at the history of composition photography, or art photography, as he was more disposed to call it, Mr. Hughes proceeded to a general review of the subject, strongly condemning the practice of producing a picture from several negatives, unless the strictest care were used to secure perfect harmony and keeping in every part. This was especially necessary in regard to the proposed plan of printing in skies from separate negatives; for, unless all the conditions of light and atmosphere present in the one were harmonious to the characteristics of the other, the result must be patchwork of the most unsatisfactory and inartistic a character.

"Give me," exclaimed Mr. Hughes, "a landscape with no sky at all, rather than with one that is not in harmony with it; for in the former case, though I may regret its absence, it does not prevent me enjoying what remains; but if the sky be not consonant with the rest of the scene, it offends me by its impertinent obtrusion, and mars the pleasure I should otherwise have experienced. There is at least this negative merit about a landscape without a sky, that it permits the mind to supply any sky it pleases; and so carefully though unconsciously is the eye trained, that whatever sky the mind supplies is sure to harmonize with the picture.

"But landscapes *may* be taken with the natural sky. Mr. Fenton has exhibited some. The late Mr. Archer took many, and very charming ones they were. But there is one class of subjects that seem to offer less difficulty, marine pieces. (*Waterscapes* I should like to call them, as distinguished from landscapes.) Water always reflects light in nearly the same amount as the sky. In 1855, Cyrus Macaire showed many pictures of vessels at sea, with the natural sky and clouds. We all remember Le Gray's famous sea-piece, and the sensation it created. Mr. Kibble, of Glasgow, has taken an enormously large picture, with the sky and water and steam-vessel, all perfect, and *on a dry plate too.* Let us not forget these facts, for they show that the hope of obtaining natural skies is by no means so desperate; and I urge especially on those who wish to see photographs take rank as works of art, not too readily to give way to any mechanical means of producing ærial effects.

"I hear that it is seriously proposed by certain photographers to take a series of negatives of clouds, *stock negatives*, to print into their landscapes, as occasion may require or taste (?) suggest. Just imagine a negative secured of one of those cloud scenes in April, when the sun bursting through sends down his beams like rays from a gigantic fan. Such a picture is a triumph, and we applaud the photographer for securing it. Suppose another negative taken of the sea on a mild and tranquil day in June, when there is scarcely a ripple on the water, and the sky is 'all serene;' such a picture will have a quiet beauty entirely its own, and quite different from the former one: but imagine the photographer not satisfied with the calm and nearly white sky, brings out his cloud negative, and, by ingenious dodging, prints in this turbulent sky, where from gaps in the clouds stream down those broad beams of light, not one of which is reflected from the calm sea beneath. What shall we say if such a picture, so deficient in the first elements of harmony, be presented for our admiration and imitation? It may startle us by its novelty, and please us by its ingenuity; but how shall we designate it? Its novelty consists in connecting two conditions of atmosphere that never did or can co-exist, and its ingenuity in skilfully combining that which never ought to have been brought together. Shall we do violence to our feelings and call it an art-photograph? or shall we hint the unpleasant truth that it is only a piece of printing-frame patchwork? or shall we let it down easy and call it a *composition-photograph?*

"It will be gathered, that I am not sanguine of the advantage of printing skies into landscapes. Shall I rest contented with white skies, then? Yes, I say, rather than have skies not in harmony with the scene; but, as the late Sir Robert Peel used to say, 'there is a third course open to us.' During a recent visit to Manchester, I was much delighted with the beautiful productions of Mr. Mudd, and particularly with the manner he treated this question of 'skies or no skies.' I don't know whether I can do justice to his plan by description, but he kindly furnished me with a few examples to show you.

"You will observe that the sky, which is usually dead white, is in his delicately tinted, and that where the sky joins the land, instead of being hard and wiry, it is extremely soft and tender. These effects he gains by very simple and legitimate means. He explained that his skies generally printed through, and to prevent this he paints them out; but in painting out he only brings his black within a quarter or half an inch of the boundary of his landscape. He softens off this black, and thus leaves the sky to this extent to print through. This not only prevents a hard outline to his extreme distances, but it gives a charming effect of atmosphere. The rest of the sky prints quite white; but after the print is taken out of the printing frames, this dead-white portion of the sky is exposed to light for a very short time just to tint it; and by these two simple devices it is surprising what a charm he communicates to those portions of his pictures that would otherwise be white paper. Understand me distinctly, he does not paint in clouds; he only introduces delicate wavy irregular tints, just enough to disturb the monotony of the dead white plane, and to suggest ærial effects. If cloud backgrounds could be printed in, in this delicate, dreamy, hazy, imaginative style, I would not object to them; but unless they can be done in this quiet, unobtrusive manner, they had better not be attempted. Meanwhile, until we get our natural skies, I call photographers' attention to the delicate and artistic manner of Mr. Mudd; for by it they can join in the cry, 'Down with white paper skies,' without running to the other extreme of keeping 'property' negatives with which to print their clouds."

Mr. Hughes exhibited two very fine landscapes by Mr. Mudd, of Manchester, to illustrate the remarks he had made. The specimens were exquisite both as photographs and pictures, and were much admired.

The Chairman thought that all must agree with many of the eloquent remarks made by Mr. Hughes; but he thought that in supposing two negatives taken under such dissimilar circumstances as had been described, would be chosen to print one picture he had imagined a very extreme case. He thought that until the progress of the art furnished a method of taking nature exactly as it was, the art of printing in a suitable sky to a landscape, which would otherwise be imperfect, was quite legitimate, and valuable as at least an approximation to the truth of nature.

Mr. Wall, after expressing his hearty admiration of the eloquent and poetical remarks of Mr. Hughes, must nevertheless dissent from him in some points. He thought it quite possible to take a separate negative of the sky at the same time, and therefore under the same conditions as the landscape and so get excellent results in the subsequent printing-in. The specimens of Mr. Mudd, which Mr. Hughes had shown, were so beautiful, that he hesitated to say one word which might appear like disparagement; but—whilst one of the pictures presented a landscape receding in tender gradations from the foreground to the extreme distance, so that nothing could be better suited than the sky produced by the method Mr. Hughes had described—the other specimen, having no such gradations in the landscape, did not strike him as so successful an effect with a sky so produced. He was disposed, however, to accept almost any sky rather than no sky; but he saw no necessity for selecting a sky which should be quite inharmonious with the landscape. On this subject of "keeping" he had prepared a few remarks in the form of a jotting, which he would read. (See p. 411).

Mr. Howard suggested that a good effect might be obtained in some cases where the subject would admit of it, by what he might describe as unequal development. When the usual development was completed, the plate might be washed, and and then the developer and a little silver poured on to that part of the sky near the horizon, greater density in that part would be obtained, softly graduating into the other portions of the sky, which might print through and produce a good effect.

Mr. Hughes said that perhaps in his desire to startle attention, and illustrate the dangers of the method under discussion, he had supposed extreme cases, and gone beyond what had been done, or would probably be done. His aim was to show the danger of trusting to mechanical dodges for the production of artistic effects. A man who always depended on crutches would never have the use of his legs: and he would rather see the same energy, skill, and attention which would be devoted to perfecting mechanical tricks, applied to striving after such improvements in the art, as would render them unnecessary. Amongst the most allowable of these mechanical aids he thought was this of Mr. Mudd's. Possibly more might be done with it than Mr. Mudd had done, as that gentleman had such a tender, reverent regard of the truth of nature, that he seemed almost afraid to do anything which would appear like obtruding his own handiwork into the picture.

Mr. Wall agreed with much that Mr. Hughes had said; but although entire reliance on a crutch was to be deprecated, he did not think a man should quite refuse the aid of a crutch until he had acquired the full use of his legs. For his own part he would rather see the worst sky printed that he had ever yet seen, than a mass of mere white paper in place of it. He would be very sorry if we never went beyond these makeshifts, but would rather have them than nothing. He fully sympathized with the tender delicacy with which Mr. Mudd attempted to improve his photographic landscapes. That very hesitation to touch them showed him to be an artist, and in no danger of spoiling them by any mechanical aids he might adopt. He would suggest, however, that although the kind of sky effect he produced, as described by Mr. Hughes, was very suitable for some pictures, as one of the specimens so exquisitely proved, it was not suitable for others. The rock and water scene before them for instance, where the turbulent water was flashing through its foam, kept in between dark frowning rocks, which formed the boundary of the landscape. Being somewhat short-sighted the first glance at the picture disappointed him sadly, the lightness of the sky was entirely destructive of breadth, and it was not until he examined it closely that he saw its beauties; but it would certainly have been better with a darker sky.

Mr. **Hughes** had already said that he doubted whether Mr. Mudd made the most that was possible of the method referred to. He believed more might be done with it. There was another point he wished to refer to in connection with these specimens. They were all from dry plates, a fact which he thought showed that the dry processes did not necessarily produce the hard negatives so commonly seen. Beautiful as these pictures were their qualities were not due to any secret process, but merely to good taste and delicate manipulation.

Mr. **Leake**, junr., expressed his perfect concurrence in Mr. Fry's remarks on the wet collodion process. He thought it was at present unrivalled for sensitiveness and certainty, and *moreover he thought it was likely to continue so.* He also perfectly agreed with Mr. Fry's remarks on sharpness and white skies, but Mr. Wall had, in his various papers at various times, so completely "smashed" these, that he must not say anything on the subject. With respect to the negative bath, Mr. Fry had stated that he sometimes used it as strong as fifty grains to the ounce. He, Mr. Leake did not think anything would be gained by using more than forty. Mr. Fry also said a slightly alkaline reaction may sometimes be allowed. He, Mr. Leake had done battle with this idea once or twice before in that place, and he must beg to state again his conviction, that if a bath were alkaline, it would be impossible to produce a picture with it, by the wet process at any rate. With the remarks on collodion he quite agreed. He thought that variety usually sold as "positive" was much better in most instances than that called "negative," especially when the iron developer was used, as was now generally the case. He should like to ask Mr. Fry his reason for using the hydrosulphate of ammonia process for intensifying. He should have thought the process with a weak solution of iodine, and subsequently pyrogallic acid and silver the best, at least it had proved so in his hands. With regard to instantaneous exposure, he thought that the shorter the exposure the better for water in motion especially. He had been fitting a sliding shutter to a camera for his own use which was very simple, not expensive, and he thought tolerably quick, but he hoped to have a better arrangement to bring before them at the next meeting. He had tried the acetate of soda in the developer, but did not like it so well. He thought nothing was gained by adding silver solution to an iron developer. In conclusion, while he very much admired Mr. Fry's prints, he would venture to suggest the printing the clouds a few shades lighter, which he thought would be an improvement.

Mr. Leake handed round a camera with a spring shutter, which we shall describe in our next. The contrivance is ingenious and simple, and was much admired.

Mr. **Fry** said he objected to any contrivance for covering or uncovering the lens by means of a spring, because he found practically the vibration a great evil. In regard to the use of bichloride of mercury and hydrosulphate of ammonia for intenifying, he was quite willing to admit that the use of iodine, and subsequent intensifying, was a more elegant and equally efficient method. The use of a fifty-grain bath had advantages, but, except in experienced hands, a forty-grain bath was perhaps safer. In regard to the use of an alkaline bath, he had only referred to an amount of alkalinity scarcely appreciable, and which might be remedied by excess of acid in the developer. For instantaneous purposes, the more nearly neutral the bath was, the better. With many of the eloquent remarks of Mr. Hughes he most cordially agreed; but he must take take exception to some of them. He was not quite sure that the more civilized men were, the more they loved pictures, at least, if Dr. Johnson were admitted as a fair illustration of a highly civilized man, for it was stated of him that he hated pictures. (Laughter.)

Mr. **Hughes** was not quite sure of the doctor's high civilization. He had heard him spoken of as "an old brute." (Laughter.)

Mr. **Fry** continued. Mr. Hughes had spoken of the use of several negatives, to produce one picture, as a confession of weakness. He fully admitted it. He would not use two negatives to produce an effect attainable with one, and he hoped the time would come when one negative would secure all the pictorial excellence they required. But until then he could not admit it was wrong to print in skies from separate negatives. White skies had made photographic landscapes objects of almost derision amongst artists, and he thought that until the resources of the art were increased, printing in skies was a most desirable improvement. He deprecated "property" skies, to be used at random, as much as any one; but he did not print in his skies just as they came to hand. He fully agreed that the charater of the skies should suit the landscape, and that the utmost judgment and taste should be used in suiting the one to the other in printing-in. (Hear.) Mr. Hughes had referred to Le Gray's famous picture. He believed that it was now universally admitted by those who knew anything of it, that in that picture there was very little of the photograph; but that it was considerably made up. One thing was certain, that the sky in it was printed-in separately. He agreed with Mr. Hughes in admiring those of Cyrus Macaire. He was also glad to agree Mr. Hughes as to the capabilities of dry plates. He had exhibited an instantaneous picture of sea and clouds taken on a dry plate. Some reference had been made to the importance of complete instantaneity in pictures of moving water; he now begged to hand round for inspection an instantaneous transparent stereograph of a breaking wave, in which each drop of water was distinctly rendered. In conclusion, he must again protest against the idea that a white paper sky was better than one printed in.

Mr. **Hughes**.—Printed in without harmony?

Mr. **Fry**.—Certainly not. Glaring incongruities must of course be avoided; and the utmost possible harmony arrived at.

Mr. **Hannaford** presented the Report of the Experimental Committee, and suggested as the time was short that it be taken as read, and that the discussion be adjourned to the next meeting.

Mr. **Leake** begged to make a suggestion whilst Mr. Ackland was preparing his apparatus, to the effect that the method now adopted of taking two negatives on one plate for album portraits, might be adopted to take two negatives, one of the landscape and one of the sky, in such rapid succession, that it would amount practically to taking the sky the same time as the landscape. There could be no incongruity in printing in a sky so taken.

Mr. **Ackland** then read a paper on "Some Optical Principles involved in the Manufacture of Photographic Lenses." (See page 409.)

After a hearty vote of thanks,

Mr. **Wall** thought that a simple method like that explained by Mr. Ackland, whereby photographers might readily ascertain at any time, whether by any accident, such as a fall, their lenses had been displaced, so as to destroy their centricity, would be very valuable, and that Mr. Ackland in thus explaining had deserved the thanks of all photographers.

Mr. **Hughes** was glad that Mr. Ackland had, by reading this paper, set himself right, as by the answer on a former occasion he had laid himself open to remark, which he had now shown there was no ground for. He thought, however, that this method of ascertaining the centricity of the lenses in a combination was better known than Mr. Ackland had imagined. He had compared notes with a friend, and one of the first methods which suggested itself in the conversation was, that if the reflected images, given by the various lenses in a combination, of the flame of a candle, were in a line, then the various lenses were coincident as to their centres, if not in a line some of the centres were out. He wished, however, that it should be understood that this was by no means a test of the value of a lens. He had examined one which was perfectly centred, and yet it was one of the worst lenses he ever tried; it was impossible to get a sharp image with it.

Mr. **Ackland** interposed that this was only one test of a good lens. Other points were necessary; and he mentioned a case which had recently happened, where a lens was properly centred and ground, which turned out quite imperfect. After careful examination, and finding no defect, it occurred to him to try it once more by polarized light as he had described; and he then found that in cementing, the heat had destroyed the annealing, and so rendered the lens perfectly useless.

Mr. **Hughes** said this just confirmed the fact he was anxious photographers should know, namely, that the proper centring of a lens was by no means the all-important consideration. A lens might be perfectly centred, and yet be comparatively worthless, whilst the working qualities were not necessarily bad, even if the centring were a little out. He hoped photographers would not, therefore, too hastily condemn their lenses after examining them by such a test.

Mr. **Wall** begged to suggest that Mr. Ackland had been quite justified in supposing a knowledge of this method of testing was a secret, when, notwithstanding its simplicity, he found so few lenses properly centred.

Mr. Dallmeyer said that the perfect centricity of all the lenses in a combination was by no means a test of a perfect instrument: neither was it a very difficult thing to centre a lens. It was much more difficult and much more important to grind a lens so as to secure true spherical curves, of such a form and according to such formulæ, as would make it give perfect definition both in the centre and the margin of the pictures. In the lenses of a telescope, where the image was a magnified one, instead of a diminished one, as in photography, and where the lenses were far apart, perfect coincidence of the axes of the various lenses was of the utmost importance. But in a photographic lens good curves and proper correction for actinism was of more importance than absolute correctness in centring. Even when photographers knew this method of testing a lens, which he certainly did not regard as a secret, the rectification must be referred to the lathe. As to the method described by Mr. Ackland of grinding a concave lens, so as to secure perfect centricity, he did not think that more certainty or better results would be attained by it than the method generally used. To arrive at absolute and mathematical certainty it was necessary to have recourse to an eccentric, universal chuck, one of which he used for his telescopic lenses, and the larger lenses for the camera. For small lenses this was not necessary, and would render them too expensive for general use. The best method for a photographer to test his portrait lens was first to focus sharply some part of the face, say the eye; if then, on taking a picture he produced a perfectly sharp image, he might conclude that it was actinically correct. If then, on further trying the same object, and found that when the camera was moved so that the image was produced by the margin of the lens, it should be equally sharp, he might then conclude that it was corrected for spherical aberration. These two points being secured, would be of much more importance than the absolute centricity of each lens in the combination. He trusted in these remarks he had not said anything which could be in any degree offensive to Mr. Ackland.

The Chairman was glad to learn that an absolutely mathematical method was adopted by Mr. Dallmeyer. It was to such a plan he had thought Mr. Ackland had referred in the first instance.

Some further conversation on the subject ensued between Mr. Ackland and Mr. Dallmeyer, after which, and the usual votes of thanks, the proceedings terminated.

Blackheath Photographic Society.

The usual meeting was held at the Golf Club House. December 17th, 1860. President C. Heisch, Esq., F.C.S., in the Chair.

The minutes of the last meeting were read and confirmed.

The President then called on Mr. Vernon Heath for his promised communication on the production of direct transparent positives from objects in relief.

Mr. Heath said he feared too much had been made of what he had to bring forward, by announcing it as a regular communication. He had intended only to fill up a few vacant minutes at any one of the society's meetings. The images to which he wished to call the attention of the society were produced under the following circumstances. He had been requested by Mr. Conyngham, of the Foreign Office, to photograph a medal of that truly great man Garibaldi, which medal by the kindness of Mr. Conyngham he was able to shew them, it was the one given by Garibaldi to his officers, the copy was to be if possible larger than the medal. Everyone knew how much easier it is to focus an object, if we see it in its usual position, on the ground glass, he had therefore without consideration inverted the medal so that it might appear upright on the focussing screen. To his surprise his photograph turned out a transparent positive instead of a negative. A little consideration shewed him the reason of this. The light falling on the inverted medal principally from above, of course illuminated all those parts which in its proper position would have been in shadow, whilst all those parts which would have been illuminated, were in shadow, and thus a positive had been produced. (The picture was here produced, and excited general admiration by its fine colour and great perfection).

This had been all which he originally intended to communicate; but on subsequently taking a negative of the medal in its true position, he found great difficulty in preventing false shadows, from not being able to throw the light exactly in the direction he required. (The negative and also a print from it were produced, and shewed a distinct double shadow round the profile). No such false shadows existed in the positive originally obtained, and he therefore thought that the process might be usefully employed for copying objects in relief, where perfect control over the light could not be obtained, by first making a positive, and subsequently obtaining a negative from it. An attempt had been made that morning to make a negative from his positive, but owing to the almost total absence of light, had failed, so that this part of the subject still remained for experiment.

The President inquired if Mr. Heath were quite sure that the light fell on the medal in exactly the same direction in both cases, or if it were not possible the false shadow in the negative was produced by the light falling on it differently. Mr. Heath replied, that the medal showed in exactly the same position, and the two pictures were taken at the same time of day, so that he thought it could not be thus accounted for.

The President remarked that though Mr. Heath had spoken very lightly of the communication with which he had just favoured the society, he, (the President) thought that all present would agree with him that it was one of great interest; it afforded a means of obtaining transparent positives without a double operation, and if Mr. Heath's anticipation turned out correct (of which he had not much doubt), might be a valuable means of obtaining perfect negatives from objects in relief, in the hands of those who were not so fortunate as to have the use of a glass room, with its blinds, &c., which gave them a perfect control over the light. He was sure the society would return its best thanks to Mr. Heath.

Mr. Harding, after stating that he quite agreed in the importance and interest of Mr. Heath's communication, proposed that the best thanks of the society be given to Mr. Heath for his paper.

Mr. Glaisher seconded the resolution, which was carried unanimously.

Mr. Heath exhibited the stereoscopic views of the exterior and interior of Windsor Castle and Buckingham Palace recently taken by Soulier, under the following circumstances. Her Majesty, wishing photographs taken of the above palaces, caused inquiries to be made of Mr. Heath on what terms he thought M. Soulier would take them. Mr. Heath replied that he had no doubt M. Soulier would willingly take them for the simple permission to publish them. This permission was immediately granted, with the exception of those pictures containing portraits of the royal family. M. Soulier, therefore, came in June last, expecting about one month's work, but owing to the badness of the season, he remained till October, before obtaining all that was desired.

The pictures excited much admiration, and the interiors not a little surprise, from their extreme beauty and the wonderful manner in which they represent objects almost over the head of the spectator.

Mr. Heath stated, that it was somewhat curious that M. Soulier had contrived to preserve the secret of his process for seven years; he could only account for it by the fact that no one but M. Soulier and his sons had anything to do with the working of it.

The Chairman asked if Mr. Heath had ever seen M. Soulier's negatives.

Mr. Heath replied that he had not. He had asked M. Soulier to shew him some, he had been very polite, but had never shewn them.* All he knew about them was that they were taken by some dry process, Her Majesty having made that stipulation before granting M. Soulier permission to come to the Castle. She said that pints of solution of cyanide of potassium had been already used on the floors and staircases, in endeavours to remove the stains produced by practitioners of wet processes, and she would have no more of it.

Mr. Heath stated his impression was that the negatives were four or five times as large as the positives, and were diminished in the camera. He knew that the printing was done by artificial light.

The Chairman said he hardly thought it possible that the negatives could be as large as Mr. Heath thought, as from the position of the objects to be photographed, a lens of very short focus must be used, and it was much easier to ensure great perfection in a small lens of short focus, than in a larger one. Had Mr. Heath any idea at what rate M. Soulier could print?

---

* We have good reason to believe that M. Soulier uses the Taupenot process.—Ed.

Mr. Heath replied that he must print very fast, as 800 copies had been sent here within a week of his arrival in Paris with his negatives. One house in London had engaged to take 40,000 before Christmas.

The Chairman remarked that Mr. Soulier probably multiplied his negatives.

After some desultory conversation on printing in general, Mr. Heath remarked that at the rate positives on paper were being now produced, he feared there would soon be a large number of fading photographs. He knew one house which had engaged to take 60,000 of the "cartes des visites" portraits of the royal family in twelve months, but the demand had been so great that 70,000 had been sold in three months. He himself never considered a print safe unless it had not only been washing for twenty-four hours, but had been sponged under a tap two or three times during that period; this of course made each print take a considerable time, but he thought it time well spent; he had some positives made in 1848 which were as good as ever.

Mr. Glaisher said he adopted the same plan with his photographs at the Observatory. All the Venetian photographs were already gone.

Mr. Heath said something might be due to the paper used.

Mr. Glaisher said a curious circumstance had come under his notice with regard to paper. He had a ream of paper which worked very well for a time, but afterwards he could do nothing with it. He ultimately discovered that the mischief arose from the paper having been kept in a room at the Observatory where gas was burning night and day: all paper kept there was spoiled, while that kept in rooms where there was no gas remained as good as at first.

The Chairman said he had no doubt that the sulphuric acid generated by the burning gas was the cause. They had good proof that at Greenwich at least plenty of this substance was formed. Mr. Glaisher had given him a quantity of an incrustation formed inside a zinc tube, used to carry off the products of combustion from one of their burners, it had been in use for about six months; this incrustation was sulphate of zinc; on being dissolved and crystallized it weighed about one pound.

After some further conversation the meeting adjourned.

Talk in the Studio.

Photography at King's College.—Mr. Hardwich has, we understand, resigned the *quasi* professorship of photography at King's College, and is about to be replaced by Mr. Thomas Sutton, of Jersey. Whilst regretting the loss to the college of a man so able and so highly esteemed as Mr. Hardwich, we congratulate the pupils on the acquisition of a gentleman of such scientific attainments, and practical skill in photography, as Mr. Sutton, who will, we doubt not, fill the appointment with advantage to his pupils and honour to himself. Mr. Sutton will, of course, henceforth, reside in London.

Photographs of Windsor Castle.—We see it stated in a contempory that Her Majesty having issued commands for photographing the interiors of Windsor Castle and Buckingham Palace by M. Soulier, Mr. Heath, to whose superintendence the work was entrusted, has now received permission to publish the stereographs, specimens of which are now on view.

Photography for Illustrations.—The Evangelical Almanac (Ward's) for 1861, contains as frontispeice a photograph of Dr. Watts's Monument executed by Poulton of the Strand.

To Correspondents.

◆

The next number will commence a new volume of the Photographic News, in which a series of new and interesting topics will be systematically treated. A series of instructive articles on art in relation to photography, by Mr. Alfred H. Wall, to be entitled, *The Technology of Art as applied to Photography*. These articles will, for the sake of system and ready reference, appear in alphabetical order, but they will in no sense be a mere dictionary or glossary; but will, besides defining *terms*, fully explain *ideas* and their applications, both as related to art and applied to photography. A series of practical papers, by Mr. Samuel Fry, will appear: these will treat of many of the branches of photography which do not occur in the everyday experience of most photographers, and regarding which we have frequently had enquiries. An interesting series of papers will appear under the title of *Notes* and *Jottings*, consisting of comments and suggestions regarding matters of current photographic interest, by Mr. Hannaford. A series of articles on Photolithography are in preparation by the same gentleman, and will appear as soon as they are ready. A series of articles on the *Manufacture* and *Testing* of *Photographic Chemicals* will appear, and will we trust be found interesting to photographers generally, and pre-eminently so to our large body of foreign and colonial readers, from many of whom we have received repeated requests for such articles. A series of articles on the *Oxyhydrogen or Lime Light, and its Application to Photography*, with some hints for its use in connection with the solar camera will also appear. All the other features which have hitherto distinguished the Photographic News will be continued. We trust that the arrangements we have made for our new volume will be taken as an earnest that we intend to leave nothing undone which can interest, instruct, or gratify our readers, and render the Photographic News worthy of its position as the organ of photography and photographers.

Mr. Richards.—In our next.

Later.—We have seen the productions of Mr. Dallmeyer's triple combinations, and can speak in the highest terms of them. We have one of his new stereoscopic combinations in use, and find it in every way satisfactory; it is very rapid, and gives perfect definition over a large field. The front lens is equally good as a view lens. We have used it with perfect success for copying and enlarging; nevertheless, we think the triple combination will probably suit your purpose better still.

W. C.—We fear that we cannot help you. The selection of a pure sample is your only reliance.

G. G.—The "pluffing up" of the mahogany which you describe may proceed from several causes; but the most probable one is that the plane iron is not sufficiently sharp. If you have not much experience in the use of tools, you had better ask a cabinet-maker to give a glance to see that yours are in proper condition. Only inspection will decide this. Nothing is better for polishing a camera than the usual French polish. Varnish will do; but it is not so durable and does not look so well.

E. W.—Stereoscopic view lenses are usually from four to five inches focus The one to which we refer of Dallmeyer's is a combination of three inches and a half focus. The front lens forms a view lens of six inches focus. Thank you for your suggestion, which shall appear.

H. L. P.—Scarcely suitable.

J. S., Longton —The large sheets of brown paper to which we referred for backgrounds are usually kept by the paper-hangers. If you were resident in London we could have pointed out a shop where you could procure it.

R. J.—It is one of the greatest difficulties met with in portraiture, to obtain sufficient detail in the silvery hair of an old man. Not only is the hair white, but it possesses some of the characteristics of a polished body, and thus reflects a great deal of light: in addition to that, the head is nearest the source of light, and is generally much more brilliantly lighted than other parts of the body. The best remedy is in lighting; take care that the head is sheltered from too much direct top light. The use of a small hand screen of black velvet at the end of a long stick, waved at a proper angle to the light over the head, has sometimes been recommended and found beneficial. It is wise sometimes in such cases to be content with a slight amount of under-development in some parts rather than quite destroy detail in the hair. Use your iron developer somewhat weak. The only remedy we can suggest in printing negatives already over-developed in this respect, is the use of a weak sensitising bath for the paper; direct sun-printing, and, if necessary, the use of a convex lens, acting as a burning glass, to concentrate the sun's rays for a short time upon the over-dense part. You will find a formula for plain salted paper in the "Dictionary of Photography" in our last.

A Man wot don't believe in dry plates being certainties, writes to state his conviction that the Experimental Committee of the South London Photographic Society have begun at the wrong end in the investigation of dry processes. Instead of beginning with the addition of preservative coatings to the film, he thinks the collodion itself the main point to be considered in dry processes, as if the right sort be found any coating, from albumen to gin and water will answer equally well, in his opinion. Our correspondent's letter shall be handed to the committee.

R. T.—In sulphur toning, the proportions of sulphuric acid and water must be definite, hence the necessity of employing monohydrated acid. The prints may be immersed in the liquid as they are removed from the printing frame, without any previous washing or fixing: the process, from inexplicable reasons, sometimes fails, if the prints are previously washed or fixed.

J. Brown, Fairplay, B., F. E. G., A Constant Subscriber, and F L. G. In our next.

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